IBM Expected to Plug Hole

CW Staff

IBM has a hole in its product line, and how and when it will plug that hole has industry analysts buzzing.

The gap in IBM's product line is a system that would provide an entry path to the company's biggest processor,

the 3033, currently the top of 30 series line. What IBM needs, the analysts agree, is a machine

3031	4341-2	3033E or 4341-2 AP	3032	3033N	3033
1.1	1.4	2-2.5	3.0	3.9	4.5

Mips Ratings for IBM's Upper End Processors

· Provide two million instructions per second (Mips).

Support the MVS operating system

Be cheap enough to lure customers to IBM's upper end mainframes.

painless migration to the soon-to-be-· Offer a announced H series of processors, expected to offer even

greater processing power than the 3033.

According to IBM watchers, IBM has two viable alternatives. It can announce a scaled-down version of the 3033, the 3033E ("E" for "entry-level"), that can be fieldupgraded to a full-blown 3033. Or it can bring out a bigger version of its 4300 series processor that would offer

the required 2 Mips plus bridge to to the low end of the H series.

The latter option would virtually eliminate

the 3033 from IBM's long-range processor line-up, severely impacting the residual values of installed systems and making their owners very unhappy. The former option would appease the 3033 owners, but it would mean the entry path to the H series would be mired in 370-era (Continued on Page 6)

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Product Spotlight Why Pick Tape Drives?

CW Staff

If disk drives can store more data and are easier to maintain than magnetic tape drives, why would anyone choose tape as a mass storage recording medium?

Even if one ignores the necessity for backup on disk subsystems, the fact remains that it would simply cost too much to convert the many large tape installations already in existence to an all-disk environment. Conversion costs in terms of machine time, manpower and media are substantial, Datapro Research Corp. said in a survey report entitled "All About Plug-Compatible Tape Drives

So tape drives will be with us for some time to come. While they are around, many vendors will provide alternatives to the mainframers

especially IBM's - own offerings, Datapro maintained.

The charts on Pages 10 and 11 detail the price, performance characteristics and availability of certain key features of tape drives available from representative plug-compatible manufacturers (PCM)

Although there is a veritable host of IBM tape drive models, most of which have inspired imitation, many users of large-scale IBM systems are concentrating on the IBM 3420 family; the charts therefore focus on 3420-type drives.

The five tape drives contrasted with IBM in the charts come from Storage Technology Corp. (STC) Memorex Corp., National Advanced Systems (NAS), Telex Computer Products, Inc. and Braegen

(Continued on Page 10)

Programmers Slammed For Not Keeping Up

By Jeffry Beeler

CW West Coast Bureau SAN FRANCISCO - Most programmers have done such a poor job of keeping themselves technologically up to date they probably constitute more of a liability to their employers than an asset, according to one of the computing field's most honored software experts, Dr. Richard Hamming.

'In many cases, employers would probably be much better off if they simply got rid of most of their programmers or paid them full salary and told them to stay home," Hamming said last week during the 10th annual conference of the Association of Computer Programmers and Analysts

(Acpa). Like their counterparts in most other highly technical specialties, programmers often start their careers at the technological forefront, but they seldom stay there for long. Before they know it, they begin to fall behind the times technologically, and as the years pass, they become more and more ob-

In the end, "the technological fron-tier simply passes them by," Hamming said as he reminisced at the conference about his long and distinguished computing career at Bell Laboratories and

Who's to Blame?

The blame for the generally low level of programmer competence lies squarely with the programmers themselves, Hamming added. Most members of the programming field barely lift a finger to keep themselves at the leading edge of technology, where they

"There are hundreds of thousands of programmers working out there in the field, but it's probably been at least five years since most of them did anything outside their companies [to upgrade their professional skills], except attend local sociabilities and beer drinks," Hamming said during a private interview following his Acpa con-

(Continued on Page 8)

French Bring 'Smart' Credit Card to U.S.

By Phil Hirsch

CW Washington Bureau

NEW YORK - A "smart" credit card that appears impossible to counterfeit was unveiled here last week by promoters of Intelmatique, an integrated family of interactive information systems that the French hope to sell to the U.S. and other countries.

Embedded in the card is a microprocessor with a 4.5K-bit memory. Among other functions, it stores a detailed record of the owner's purchases.

The French have also developed a quick response scheme for protecting merchants and users when a card is lost or stolen. Within 24 hours after

the loss is reported, the card number is transmitted to a "negative file" kept within each participating merchant's point-of-sale terminal. If the card is

used afterward, it is automatically des-

An electronic directory terminal and (Continued on Page 8)

Application Software Tied to IDMS

By Rita Shoor CW Staff

WELLESLEY, Mass. Cullinane Corp. recently tied application soft-ware to its Integrated Data Base Management System (IDMS), then announced a service that provides such support as an alternative disaster recovery center for the applicationIDMS combination.

The Integrated Application Service (IAS) also includes four other compo-

- The application products them-selves all of which have been pre-
- viously announced. · An Application Development System (ADS).
- · Various data access tools.
- Application audit tools.

"Basically, applications solve the end-user's problems," President John Cullinane pointed out as he enumerated the reasons behind the firm's integrated concept. He indicated that the provision of appropriate applications (Continued on Page 4)

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At Presidential Forum

Carter Rep Urges Greater Privacy

By Marguerite Zientara CW Staff

NEWTON, Mass. - Privacy safeguards must be increased through legislation in the face of increasing gov-ernment and business data banks, according to Stuart Eisenstat, assistant to President Carter for domestic affairs.

Representing Carter at a Presidential Forum here last week sponsored by the Associated Industries of Massachusetts, Eisenstat made the statement during a question-and-answer period following his 15-minute presentation.

After stressing the present lack of adequate privacy safeguards, Eisenstat noted, "That's why we submitted to Congress earlier this year five packages of legislation, along with a privacy message." Noting that the proposed legislation covered "medical, personnel, insurance and several other areas," Eisenstat postulated that the bill dealing with medical records "may be passed in the post-election period."
He emphasized that the Carter adIBM Suit Irks Reagan Rep

NEWTON, Mass. — The Reagan administration would apparently be unfavorably disposed toward the protracted antitrust actions against IBM and AT&T, judging from comments made last week by a highlevel Reagan representative.

Speaking at a Presidential Forum sponsored here by the Associated Industries of Massachusetts, Sen. John Chafee of Rhode Island said the antitrust actions "bother me." Admitting that he was not aware of 'all the intimate details" of the cases. Chafee noted nevertheless that the IBM case "was brought the last day [Attorney General] Ramsey Clark was in office."

Chafee, who contrasted Reagan's belief in government-industry "co-operation" with Carter's alleged policy of "confrontation" during his formal presentation, suggested the suit against IBM stemmed from the same motivation as the unsuccessful "Milk Fund" suit against then-Secretary of the Treasury John Connally during the Nixon admin-

"If his name hadn't been John Connally, that action would never have been brought," Chafee said.

"And if that company's name weren't IBM, that suit would never have been brought," he added.

ministration worked very closely with companies and businesses in writing the legislation - "It wasn't a fiat."

Computer-Based Modeling Wins **Economics Nobel for American**

PHILADELPHIA - Dr. Lawrence R. Klein has won the Nobel Memorial Prize in Economic Science for his work in computer-based econometric model-

The Benjamin Franklin Professor of Economics at the University of Pennsylvania, Klein is reportedly one of the first econometricians to draw up a model of the U.S. economy. He started working on modeling while at MIT from which he received his Ph.D. in 1944

Based on the models he developed,

Klein founded Wharton Econometric Forecasting Associates, a firm producing econometric studies for corporations and government. Although the firm was recently sold to Ziff Corp., Klein still serves as its chairman.

Using variables such as strikes and new trade agreements, four times a year Wharton Econometric Forecasting makes two-year and 10-year predictions of the economy.

Klein has also directed the development of a large international econometric model called Link

As further proof of Carter's dedication to guaranteeing citizens' rights to privacy, Eisenstat cited The Stanford Daily legislation signed last week that protects the sources used by any newspaper so that no unreasonable searches and seizures can be made without a subpoena.

While energy, the economy and foreign policy were the real topics of the day, Dr. Alton Frye, director of policy planning for Rep. John Anderson, addressed the question of whether the U.S. should export high technology systems to the Soviet Union.

In view of the Soviet-American relationship, Mr. Anderson strongly supports limits on such exports, just as he supports the grain embargo [against the Soviet Union]," Frye said, "because he does not wish to condone, even by indirection, the Soviet aggression in Afghanistan.

This Week

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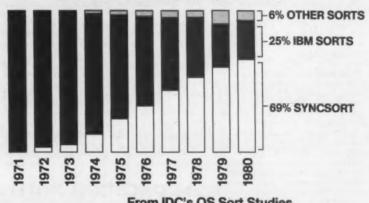


In 1971, nobody used our sort.

THE FACTS: Back in 1971, SyncSort had no users, except for a handful of beta-test sites. Today, according to the 1980 independent sort survey conducted by the International Data Corporation, SyncSort is the most widely used sort program in America on large IBM computers.

Just how rapid and pervasive this growth has been can be seen in the following illustration:

In 1980, 69% use SyncSort!



	LIVIII			
USERS OF	1977	1978	1979	1980
SYNCSORT	43%	54%	62%	69%
III IBM SORTS	53%	42%	29%	25%
Other SORTS	4%	4%	9%	6%

Call (201) 568-9700.

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THE REASONS: In less than a decade, SyncSort has asserted unrivalled leadership in every phase of sorting technology. Virtually every advance in sorting has appeared first in a long line of SyncSort releases.

As a result a "sort gap" has been created. IBM sorts can no longer compete successfully with SyncSort in any of the following critical areas:

- PERFORMANCE. In terms of resource usage, sorting has become one of the advanced areas of data processing. Compared to IBM sorts, SyncSort will save you an average of 20% in CPU Time, 25% in EXCPs, and 30% in Elapsed Time.
- 2. PRODUCTIVITY. One of the prime reasons for SyncSort's rapid growth is its popularity with programmers and managers. We've built in a host of labor-saving features INCLUDE/OMIT, SUM, INREC/OUTREC and sophisticated copying facilities to reduce coding, compiling and debugging. In typical selection-report applications or modifications, a job that would take five days using a programming language can be accomplished by SyncSort in one day.
- 3. CUSTOMER SERVICE. It's always been good, but now we've reduced it to a science. A sophisticated TSR (Technical Service Report) System permits us to follow up service requests quickly and accurately. As a result, 85% of all requests for sorting assistance or advice are resolved within 24 hours.

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Adds Processor, Terminals, Modems

Codex Unveils Support for Multivendor Nets

By Brad Schultz

BOSTON — Codex, Inc. made its case for integrated, multivendor data networks last week by releasing a communications processor, a series of intelligent terminal systems, four modems and other products intended to make networks "friendly mediators, transparent to all computer architectures, protocols and software packages."

Able to statistically multiplex data and digitized voice transmitted through a network at speeds up to 64K bit/sec, the Codex 6050 Distributed Communications Processor (DCP) is said to support any mixture of asynchronous, bisynchronous and High-Level Data Link Control protocols and give access to public data networks by meeting the X.25 interface standard.

Joining the 6050 DCP is the CDX-68 series of intelligent terminal systems, which endows a single terminal, running alone or in clusters, with multiple office functions. Available in three models, the CDX-68s can be programmed by users in Cobol, Basic and macroassembler, Codex stated.

The Motorola, Inc. subsidiary also introduced the CS 48FP, CS 96FP, CS 4800 and CS 9600 data modems. All four units run at 4,800- and 9,600 bit/sec for point-to-point and multipoint links and optionally handle voice over leased circuits.

Finally, Codex unveiled the NA 1296 Network Adapter, which allows all modems not equipped with the vendor's network control capability to become part of its Distributed Network Control System (DNCS).

Problem Areas

Each of these products addresses one of three broad problem areas in what Codex defined to be its "integrated communications" approach. They are exchange, getting information into the network; transport, getting information through the network to its destination; and command, controlling the network from a central site.

Codex's CDX-68 series of intelligent terminal systems and the vendor's digitized voice products address exchange, senior vice-president Gerald J. Murray told the press here. "By digitizing voice at low data rates ... voice conversations can be transmitted over the same facility as data traffic to save on-line costs," he said.

The CDX-68s can handle office documentation or act as local data entry terminals, Murray said. Supporting batch, interactive and teletypewriter protocols, the user-programmable terminals feature a number of diagnostics and performance monitoring capabilities.

The low-end Model 10 was designed for interactive communications compatible with IBM's 3271, 3275 and 3276 bisynchronous protocols. The CDX-68/10 supports a variety of IBM systems programs, including CICS, IMS, TSO and CMS, a spokesman noted, and can be configured as a single station or in a cluster of up to eight terminals and two printers.

terminals and two printers.

The Model 20 CDX-68 intelligent terminal supports IBM 2780 and 3780, multileaving and teletypewriter protocols in addition to the 3270 protocols and provides an auto answer capability for unattended operation in batch mode, the spokesman stated. The high-end Model 40 offers up to 40M bytes of data storage in addition to the CDX-68/20 features.

As for transport, the second component of the Codex integrated communications approach, Murray said the 6050 DCP "will route communications from any source to any source in a completely transparent fashion." Supporting up to 250 terminals per network node, the processor has an adaptive routing capability that automatically bypasses congested or failed lines in getting information to its destination.

Moreover, the user can select a particular routing and reduce transmission costs with the 6050's data compression feature. A protocol intervention scheme compensates for the transmission delays that arise from satellite links, Murray added. Those delays inevitably result from the enormous distances involved in bouncing data off objects in outer space. Under command, the area of Codex's

Under command, the area of Codex's integrated communications approach concerned with control from a central site, the CS series "Network Control" modems report the condition of network's lines to the DNCS. This gives "the user the right kind and amount of information necessary to ensure the highest possible network availability," Murray noted.

Another product announced under the rubric of command last week was Codex's NA 1296 Network Adapter, which is coupled with each modem required centralized control by the DNCS. The adapter adds the independent secondary channel through which all network management is accomplished, a spokesman said.

Initial shipments of the 6050 Distributed Communications Processor are slated to begin next July. The 6050 costs between \$40,000 and \$80,000, depending on configuration. The CDX-68 series intelligent termi-

The CDX-68 series intelligent terminals are available within 60 days of order and cost between \$4,000 and \$25,000, Codex continued. The CS series modems cost \$7,975 and \$7,475, respectively, for point-to-point and multipoint versions of the 9,600 bit/sec models, and \$4,675 and \$4,175, respectively, for point-to-point and multipoint versions of the 4,800 bit/sec models.

Two-year leases for those four modems, taken in order, cost \$195, \$175, \$120 and \$100 per month. With an estimated mean time between failure of more than 30,000 hours, those modems will ship beginning this January. The NA 1296 Network Adapter will be shipped, starting next month, at a cost of \$820.

Codex is located at 20 Cabot Blvd., Mansfield, Mass. 20248.

Application Software Tied to IDMS

(Continued from Page 1)
packages to IDMS users would result
in better market control for Cullinane
than could be obtained by "working
through a middleman."

Full Compatibility

The company's applications products will be fully compatible with IDMS and all other Cullinane software. "Our users will have an integrated set of software programs that can cross-reference each other, providing types of information that were previously very difficult to obtain," Robert Goldman, senior vice-president, maintained

Most of the applications offered through IAS applications will be acquired from the existing customer base or through acquisition of companies in the software business, according to Cullinane, and the \$15 million in proceeds from the firm's recent public stock offering will be utilized in this acquisition campaign.

Among the software products currently being offered to what Cullinane described as "a ready market for applications both within industries and across industry lines" were:

 Customer Information System (CIS). Based on a product developed by Boatmen's National Bank in St. Louis, it ties name and address information to various financial applications.

 On-Line English (OLE). This tool reportedly allows the nontechnical manager to access data via simple, English-like commands.

• On-Line Query. This is a more highly structured inquiry/response system than OLE.

 Culprit. A data retrieval package, it was designed to generate userspecified reports.

An application data center that will function as both an alternative development and processing center for Cullinane customers and — in a different direction — as a disaster recovery site for installations with critical DP operations is a major component of the integrated service concept, Cullinane said. He described the disaster recovery service as similar to that provided by Philadelphia-based Sun Information Services Co.

Executives are aware of what can happen in the event of a major data center breakdown, but "what top management hasn't seen is an intelligent response to the disaster recovery problem," he said.

"A number of our clients are so de-

pendent on computers that if they lost their processing power for even a day, they could lose a critical edge over their competitors," Edward Somol, general manager of computer services, noted. Cullinane customers that subscribe to the service will be able to use the data center in the event of installation breakdown caused by a natural disaster.

The data center will also provide current and prospective IDMS users with a fully compatible computer environment in which to develop their own applications, the vendor said. Clients are offered the use of an IBM 3033 mainframe, technical support, IDMS integrated software and necessary machine time.

Cullinane's applications users will also have access to ADS, which reportedly automates the process of developing update applications for their respective data bases. This tool is available in both on-line and batch versions, the firm said.

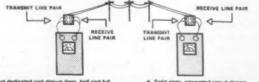
Application tools offered as part of IAS include EDP/Auditor, a package that combines report-generating capability with a library of audit routines to perform tasks such as file footing, sampling and exception and summary analysis, Cullinane said.

IAS pricing depends on what is already in place at the customer's installation, according to Cullinane. IDMS and CIS are priced together at about \$200,000 and the purchaser of IDMS and all of the application packages and tools will spend more than \$300,000, he said. These figures do not include subscription to the disaster recovery service, the fee for which has not been released.

Cullinane Corp. is at 20 William St., Wellesley, Mass. 02181



The TP-260 Data Line Tester offers the user the ability to test both dedicated and dial-up telephone lines and get a quick indication of suitability for data transmission. The unique design of the TP-260 is such that these tests can be carried out by unskilled persons and results are read directly in terms of tarriffed requirements for data lines.



- Test dedicated and diel-up lines, half and fur illumins
- # Hand-held, battery operated
- Audio output tests continuity, circuit noi



STC Brings Out Competitors for 3380, 3370

By Rita Shoor CW Staff

LOUISVILLE, Colo. — With a double-barreled flourish, Storage Technology Corp. (STC) last week announced plug-compatible disk drive alternatives to IBM's large-capacity 3380 and its Fixed-Block Architecture (FBA) 3370.

Designated the 8380, the count-keydata (CKD) device offering more than 2.5G bytes of storage is fully compatible with the 3380 and attaches to 370/158, 370/168 or 30 series and compatible systems via 5TC's recently announced 8880 control unit, according to a company spokesman.

The drive is a two-spindle unit with two independent actuators and separate supportive electronics for each spindle, he said. Storage capacity per actuator is approximately 630M bytes and the 8380 is said to transfer data at the rate of 3M bytes/sec with an average seek time of 16 msec.

Although essentially identical to the 3380 in terms of these specifications, the 8380 is claimed to offer a 10% performance improvement over its IBM competitor. The improvement is attributable to STC's dual-port option, which compared favorably to IBM's dual path selection during testing, according to Jim Fleming, disk product manager.

Disk storage capacity has increased by a factor of 20 since IBM's 2314 was introduced, he pointed out, while performance has only improved by a factor of two.

Therefore, STC's concentration is on increasing performance and one step in this direction is the reported reduction in queuing time through its dual-port option, Fleming explained.

Amdahl Unveils Rival to 3705-11

SUNNYVALE, Calif. — Amdahl Corp. last week announced a programmable communications processor called software-compatible with its IBM counterpart, the 3705-13

IBM counterpart, the 3705-11. Amdahl's Model 4705 communications processor is claimed to offer improved price/performance over the 3705-11. At the vendor's benchmark center here, the 4705 registered 1.8 times as much throughput capacity, a spokesman maintained, as a "similarly configured" 3705-11 Model F8, while costing 10% to 15% less.

The 4705 comes in four models — the 4705-5, -6, -7 and -8 — with accommodation for 64, 160, 256 and 352 communications lines, respectively. Each basic model has 64K bytes of memory, the spokesman continued, and may be enhanced or field upgraded to a larger model at the customer site.

First customer shipments are scheduled for the remaining months of 1980 in the U.S. and Canada, and a European plan will be announced later this year with shipments expected to begin in third quarter 1981.

A typical 4705-5 communications processor configuration costs about \$60,000, the spokesman estimated. A typical large 4705-8 system will go for about \$350,000. Monthly maintenance will range from \$300 to \$1,500 and two- and four-year leases are available, he confirmed.

In conjunction with the 8380, the vendor introduced its FBA Model 8370 as a plug-compatible replacement for IBM's 3370 drive.

Said to offer a storage capacity of 571.3M bytes, the fixed-media 8370 has one spindle with two independent actuators, a company representative said. Specifications include FBA formatting with a data transfer rate of 1.86M byte/sec and an average seek time of 20 msec.

In addition to its two-pronged product introduction, STC announced data streaming channel support for its solid-state Model 4305 disk. This feature allows customers to choose between data streaming or 2-byte-wide modes in order to attain a 3M-byte transfer rate, according to the vendor. While offering channel protocol support of both 3M-byte transfer rate methods, the 4305 provides standard 1.0M-byte/sec and 1.5M-byte/sec data rates and is said to be fully compatible with IBM 370/135 or larger systems and their equivalents. Six models of the 8380 drive are be-

Six models of the 8380 drive are being offered and four of them contain the associated drive controls, STC said. All models include the storage media and offer dual port accessing and 5.6M-byte fixed-head capacity as options, the vendor noted.

The 8370 is available in four drive models designated A1, B1, AA1 and BB1, STC said. Models A1 and AA1 contain storage media and associated controls and the dual-port option is offered on models AA1 and BB1, the

vendor said. All models are said to be supported on IBM 4300 series and compatible CPUs.

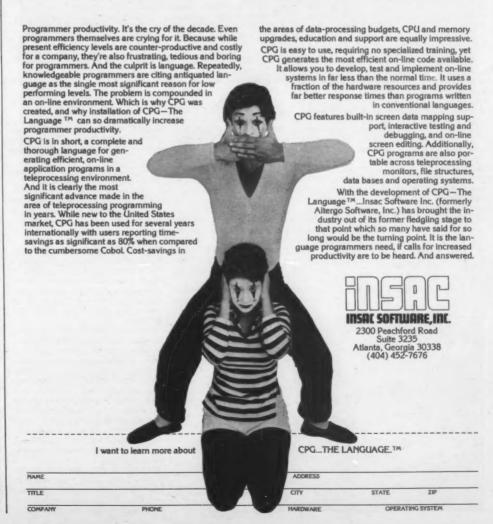
First customer shipment of the 8380 is scheduled for the second guarter of 1982 and prices will range from \$79,380 to \$139,630, according to a company representative.

With first customer shipments set for the fourth quarter of 1981, the 8370 will cost between \$25,270 and \$46,330, he said.

The data streaming channel support for the 4305 is also scheduled for first customer shipment in the fourth quarter of 1981. Current price for the 4305 utilizing either the 2-byte mode or data streaming mode is \$84,735, STC said from its headquarters at 2270 S. 88 St., Louisville, Colo. 80027.

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How Will IBM Bridge Mips Gap In 30 Series?

(Continued from Page 1) technology, a rather expensive and somewhat outmoded means of computing.

Why a Hole?

The hole in the IBM product line was created by two events in the past year. In November 1979, IBM announced its 3033N processor, a smaller version of the 3033 that is field-upgradable to the larger processor [CW, Nov. 5]. That move virtually eliminated IBM's 3032 processor because the 3033N is slightly more powerful — 3.9 Mips compared with 3 Mips.

Moreover, although it is more expensive — \$1.8 million compared with \$1.6 million — the 3033N is a better deal in the long run because of the field upgrade capability. Therefore, it is more attractive to users.

Then, last month, IBM announced the 4341 Model Group 2, a 1.4-Mips processor that offers slightly more performance at about half the price of the \$800,000 1.1-Mips 3031 [CW, Sept. 22]. The Group 2 CPU makes the 3031 an unlikely choice for the user looking to migrate up the IBM line.

looking to migrate up the IBM line. With the 3031 and 3032 processors virtually knocked out as serious contenders in the large mainframe market-place — even though both are still available — IBM users are faced with a big gap in processing power. They must choose between the 1.4-Mips 4341-2 or the 3.9-Mips 3033N.

The gap opens a fertile market for

SYSTEM	3031	4341-2	3033E*	4341-24 AP	3032	3033N	3033
Relative Performance ¹	54	66.7	105	105	124	192	223
Memory Size in Bytes (Minimum to Maximum)	2M-8M	2м-8м	4M or 8M	2M-8M ³	2M-8M	4M or 8M	4M-16M
Purchase Price (Memory Size)	\$800,000 (2M)	\$385,000 (2M)	\$1,000,000 (4M)	\$600,000 (4M)	\$1,642,000 (2M)	\$1,800,000 (4M)	\$2,870,000 (4M)
Monthly Lease (Lease Term)	\$25,130 (4-year)	\$10,100 (2-year)	\$34,500 (4-year)	\$20,200 (2-year)	\$43,630 (4-year)	\$53,840 (4-year)	\$75,070 (4-year)
Memory Cycle Time (nsec)	345	Not Available	285	Not Available	320	285	285
Machine Cycle Time (nsec)	115	120-240	57	120-240	80	57	57
Channels (Minimum to Maximum)	6	6	6-12	6	6-12	6-12	12-16
Cache (Buffer) Size	32K	16K	64K	16K	32K	64K	64K
Bus Architecture?	No						
Price per 1M Byte Of Main Memory	\$50,000	\$15,7002	\$50,000	\$15,700	\$50,000	\$50,000	\$50,000

Relative throughput based on the IBM 370/158-3's equaling 45.

Performance based on manufacturers' claims.

Performance based on manufacturers' claims.

2. Price for an upgrade from the 1M- to 2M-byte model is \$15,500.

3. Some analysts say IBM will enhance the main memory options on the 4341-2 prior to announcing a 4341-2 AP.

4. Figures represented for the possible 4341-2 AP and 3033E pro-

cessors are estimates of what IBM is likely to announce. Since either processor would be an enhancement of an aiready-announced CPU, characteristics like memory cycle time, machine cycle time and cache (buffer) size will probably not be changed. Other figures such as relative performance, memory size, pricing and available channets are variable. Those figures are based on industry analysts' predictions and IBM's historical marketing strategies.

IBM's Upper End Processors - And Where Anticipated Models Would Fit

plug-compatible mainframers such as Amdahl Corp. with its 470 V/5 and National Advanced Systems (NAS) with its AS/7000 line to steal some potential IBM customers looking for a 2-Mips processor.

Since it may be losing out on some business, IBM won't let the performance gap stand for long, most IBM watchers agree. Robert Fertig, vice-president of Advanced Computer Techniques Corp., believes IBM will close the gap in about three weeks by announcing the 3033E along with the first one or two models of H line.

The announcement, Fertig predicted, will be for a 10- to 12-Mips mid-range H series machine and possibly a larger 14- to 15-Mips processor and the 2- to 2.5-Mips 3033E.

In addition, IBM will announce a scaled-down version of the MVS operating system that will appease 4341-2 users because it will consume less memory, he said.

'Crippled 3033E'

Fertig characterized the 3033E as "a crippled 3033 which is field upgradable to give the full [3033] power. That

should fill the price/performance gap between the 4341-2 and the 3033N. This entry-level 3033 will come in at roughly \$1 million."

Other IBM watchers such as The Yankee Group's Gerard Hallaren, International Data Corp.'s John Rehfield and Kidder, Peabody & Co.'s William Easterbrook agreed with Fertig's scenario, but were less committal on the announcement date. While Fertig said the announcement will come within 30 days, the others said it will probably come before the end of the year or possibly in January 1981.

Electronic 'Experiment' Continues

Newspaper Staffers Vote to End Strike

By Marguerite Zientara CW Staff

MINNEAPOLIS — Striking members of three unions at the Minneapolis Star and Tribune Co. here have voted to end a 27-day strike which protested, among others things, the newspapers' entry into Compuserve, Inc.'s electronic newspaper experiment [CW, Sept. 29, Oct. 13].

The firm, which publishes the morning *Tribune* and the afternoon *Star*, still plans to join the Compuserve network in the late spring or summer of 1981

"We're so damned glad [the strike] is over, "Lee Canning, the firm's business manager, declared last week. "We feel the settlement provides us with the opportunity to proceed with the experiment on electronic delivery of information — and I emphasize experiment — which will be useful and beneficial to both the company and our skilled news gatherers."

Stumbling Block

On the issue of electronic distribution of news, a major strumbling block in negotiations, Twin Cities Newspaper Guild members agreed to forego a 25% share of profits gained from articles that will be distributed electroni-

When asked whether striking Guild members were satisfied with that compromise, Guild spokesman Bob Haygen stated, "We've said all along that we had flexibility on that issue and were willing to negotiate.

"We decided it was an appropriate action to give it up," he added.

The new three-year contract, however, retains a 25% payment on the traditional resale of articles, according to Hayeen

Concessions Made

While the strikers did win higher wages and a revision of the company's seniority policy, they did not obtain a return to its earlier company car expense policy or the job security assurances they desired in the face of the firm's entry into electronic newspaper delivery.

Contract language was improved, however, in the area of jurisdiction — "who's going to do the work and where it's going to be done" — another concern stemming from the newspapers' entry into the Compuserve network, Haygen noted.

On strike from Sept. 13 through Oct.9 were 450 members of the Newspaper Guild, including reporters, copyeditors, photographers, circulation district managers, promotional personnel, copy aides, news technicians and clerical workers.

In addition, 170 members of the Mailers Union Local 4 and about 20 Machinists Union members participated. The other 10 unions represented in the plant honored the picket lines.

But Tom Crotty, an analyst with The Gartner Group, maintained they are wrong. His firm is predicting that IBM will wait until mid-1981 and announce an attached processor version of the 4341-2 that will offer in the neighborhood of 2 Mips and will run the MVS operating system more efficiently than the current 4341-2 processor.

Opposing View

Crotty contended IBM's current product line really hasn't changed that much in light of the 3033N and 4341-2 announcements. IBM has replaced two processors with two others, so the gap may not be as significant as other analysts say.

Crotty admitted there is a need for an IBM 2-Mips processor, but he said IBM is not urgently trying to bring such a machine to the marketplace.

There seems to be a plan within IBM for a 3033E processor, but IBM decided not to go through with it, Crotty said. Rather, IBM will proceed with plans to announce the H series in late October or early November and announce a 2-Mips 4341-2 AP around mid-year, he forecast.

ACT Briefing Slated On Possible 3033E

MONTREAL — Advanced Computer Techniques Corp. (ACT) will hold a briefing session on the competitive position of a possible IBM 3033E processor at a seminar here Dec. 1-3.

The Seminar is sponsored by ACT in cooperation with Whitstead Publishing Co., based in Toronto.

More information is available from ACT at 437 Madison Ave., New York, N.Y. 10022.



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To Meet Needs of Novice Users

New Peripherals Stress 'Human Engineering'

By Jeffry Beeler CW West Coast Bureau

SAN FRANCISCO - Terminal and printer vendors are becoming increas-ingly sensitive to the need for "human engineering," and their efforts to re-spond to that growing customer demand were clearly in evidence at last week's Mini/Micro Conference and Exposition.

To a certain extent, hardware manufacturers have long sought to make their products approachable by lay users, easy to operate, suitable for business-office use and "considerate" of human comfort.

Recently, however, peripheral sup-pliers' efforts to simplify their "human interfaces" have acquired a new urgency as minicomputer-based systems have grown in popularity and found their way into the hands of more and more technically unsophisticated end users.

Today, ease of operation and user comfort are fast becoming as much a part of a terminal's or printer's design criteria as more technical considerations like transmission rate or print speed.

The peripheral business's increased emphasis on "ergonomics" was apparent last week among several of the Mini/Micro show's exhibitors, including Lear Siegler, Inc., Ampex Corp. and Televideo, Inc. Each of the three vendors used the sixth annual conference, which attracted about 150 exhibitors and reportedly drew an openingday crowd of some 2,100, as an occasion to introduce products or enhancements packaged to suit the special needs of novice or office computer users.

Intermediate Terminal

Lear Siegler, for example, announced an additional Intermediate Terminal family member that reportedly com-

DPers Contribute Big To Afghan Aid Fund

PORTLAND, Ore. - DPers here reportedly have been the most generous contributor to American Aid for Afghans, Inc., a nonprofit organization supplying food and medical relief to Afghans displaced by the Soviet invasion of Afghanistan.

Don Weidenweber, founder of the organization and president of Com-puter Concepts, Inc., got involved with the Afghanistan situation because "like a lot of other people, I was upset by the Soviet invasion of Afghanistan and wanted to do something about it.

After exhausting the more conventional avenues of protest - such as writing to his congressman -Weidenweber decided to take direct action. He gathered together some people who were familiar with Afghanistan, then organized a board of directors from among the Portland business community and began seeking funds.

DPers were the most responsive to Weidenweber's appeal, and he has a theory why: "Computer people seem to have a better sense of international-

American Aid for Afghans, Inc. is based at 6443 S.W. Beaverton Highway, Portland, Ore. 97221.

bines ergonomic packaging with the capabilities of the firm's existing ADM-21 terminal. Designated the ADM-32, the latest Lear Siegler CRT terminal provides a detachable keyboard whose front edge extends for-ward and is rounded to serve as a hand

The terminal's antireflective screen surface and 10° display angle reportedly minimize glare and eye fatigue, while its 15.5-in. height allows most operators to position their line of sight within 15° of the unit's central axis.

Available in either 12-in. or 15-in. screen versions, the ADM-32 also sports an optional tilt mechanism that positions the display surface at any

one of six angles ranging from 10° backward to 5° forward. Both the terminal's brightness-control

CW at

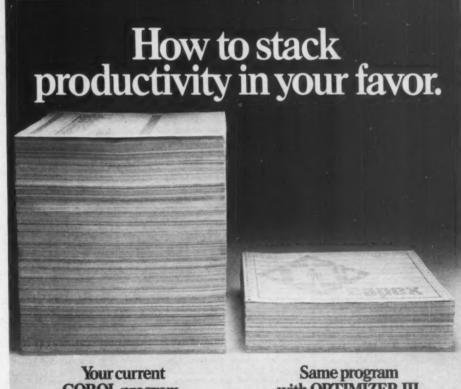
transmission-rate settings are mounted

Lear Siegler also used the Mini/Micro conference as a forum to introduce an acoustic-quieting cover for the firm's existing Model 310 Ballistic printer. Made of clear Plexiglas, the optional cover fits over the serial dot-matrix

printer's paper exit. The covers cost \$100 each

Among some of the other humanengineered products introduced at the Mini/Micro show was Ampex's DM-9300AQ disk system, a plug-compatible replacement for Control Data Corp.'s Model 9766. The 300Mbyte Ampex unit comes in "quietized," foam-insulated cabinet.

A front-end opening lid and an "optimal" height of 30 in. ease insertion and removal of the DM-9300AQ's disk packs, Ampex said. The system also complies with recent Federal Communications Commission standards for electromagnetic radiation and costs \$10,000 in small quantities.



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Programmers Slammed for Not Keeping Up

(Continued from Page 1)

ference keynote address.

Hamming, who formerly headed the Association for Computing Machinery and who now serves as adjunct professor at the U.S. Naval Post-Graduate School, cited professional obsolescence as one of the main reasons for the computing field's generally low level of programmer productivity.

Hire the Best

To compensate for their programming staffs' often paltry output, many computing department managers simply hire additional programmers, but that practice usually only makes the productivity problem worse. "If you've got a project that falls behind schedule, putting more people on it

only slows you up," Hamming said.
"It's better to have a few program-

"It's better to have a few programmers who are very good and pay them well than it is to have a whole acre of second-rate people. It'll cost you far more in time and everything else to have second-rate programmers than to have a few who are really first rate."

The only effective antidote to the problem of low programmer productivity is for computing personnel to follow a strict regimen of professional books, attending meetings and studying trade journals, Hamming said.

Hamming's own regimen of professional development includes teaching university courses at night to force himself to keep pace with his fastmoving field's technological developments. He also periodically reviews books and technical articles.

"I put myself on the firing line regularly and let people take shots at me," he said. "I get out there where the action is. I don't hide where it's safe."

In addition to preventing themselves from becoming professionally obsolete, programmers should strive to make their systems easy to use, debug and modify so nontechnical users can do their own jobs without turning for support to their companies' computing departments.

"Programmers should constantly be trying to make themselves obsolete, to write their programs in such a way that a system can be used without them," Hamming said during his keynote address. "Unfortunately, most

programmers are afraid to let users be independent of them and, as a result, their lives are constantly full of business, and they hardly ever find time to think."

In a similar vein, Hamming urged programmers to strive constantly for simplicity in their work. Most programs, he said, are "vastly overcomlex"

Hamming also urged programmers to rethink their projects at regular intervals during the product-development cycle — and he practices what he preaches. While he was still working at Bell Laboratories, for example, he reserved each Friday afternoon as a time when he would "think only great thoughts" and banish all the distractions of the workaday world.

French Firms Bring 'Smart' Credit Card to U.S.

(Continued from Page 1)

a videotex system called Teletel were among the other products displayed and discussed at last week's U.S. introduction of Intelmatique technology.

The directory terminal will be given away free to all French telephone subscribers during the next several years. One aim is to eliminate printed telephone books; another is to equip all French households with a terminal capable of accessing a variety of on-line information services. A third aim is to create the volume needed to make the price of the related systems attractive to foreign purchasers.

A large-scale field trial of the new directory terminal is scheduled to begin in Brittany late next year. By April 1982, Intelmatique Marketing Director Roy Bright explained, about 200.000 terminals will be installed.

Electronic message service is among the applications that will be supported by the directory terminals. Users will be able to compose their own messages, using the keyboard or order standard ones that include both text and graphics.

The telephone company will charge the users of its electronic directory service, as well as the service providers. Charges have not been worked out yet, but Bright said a basic fee of 40 centimes — about 12.5 U.S. cents — will be imposed on the user. It will buy him five minutes of connect time. In some cases, the user will also have to pay an additional fee to the service provider.

Teletel Videotex

Next January, the French plan to begin a field trial of their Teletel videotex system. The hardware consists of a standard color TV set, telephone, full alphanumeric keyboard and a decoder—an interface that converts the received information from binary code into a TV display.

Some 2,500 households in Velizy, a Paris suburb, will participate in the trial, along with some 200 information providers. Among them is La Redoute, the nation's biggest mail-order retailer.

Possibly the most interesting feature of the La Redoute application is the way merchandise will be delivered after it has been ordered.

In Paris, the company has installed microprocessor-controlled lockers within a number of metro and railway stations. When an item is placed inside

AT&T Slates Third EIS Test

By Phil Hirsch

CW Washington Bureau

AUSTIN, Texas — AT&T will begin its third test of the on-line Electronic Information Service (EIS) here next summer. Besides providing information now found in printed telephone books, the system will allow subscribers to set up their own data base files and access the information at will.

Recipes, frequently called telephone numbers and personal reminder notes are among the items that could be input, according to a spokeswoman for Southwestern Bell Telephone Co., which is cosponsoring the trial with AT&T.

The Austin test is the latest of three Bell System ventures utilizing videotex technology, which connects a computerized central data base to a home or office CRT/TV terminal through standard voice-grade telephone lines.

Besides AT&T, several other suppliers are attempting to develop videotex and a related system called teletext into a nationwide, on-line home information system. Other countries — notably France, Canada and the UK — are doing likewise.

The first AT&T EIS trial run, in Albany, N.Y., began last fall [CW, Sept. 3, 1979]. The second — a joint venture with Knight-Ridder Newspapers, Inc. in Coral Gables, Fla., a Miami suburb, began last July [CW, July 28].

The upcoming Austin trial will last 14 months and involve about 700 subscribers; the data base will encompass a million name and number listings from the 512 area code and 100,000 TV display frames of other information — most of it taken from the Austin Yellow Pages and those of other cities within the 512 area code. As a result, the Austin trial will be considerably larger than the one in Albany.

Also, unlike Bell's first Electronic Information System trial, this one will use a standard color TV set, rather than a CRT. And the Austin trial will be the first in the series to allow the user to input personal information.

Viewtron Terminal

AT&T said the terminal to be used in Austin will be like the one employed in the Coral Gables Viewtron test, but no additional details were provided.

The Viewtron terminal has two input devices — a full Ascii keyboard, capable of accommodating both keywords and full-text messages, plus a hand-held keypad about the size of a pocket calculator.

A hierarchical search strategy is used. The viewer first punches a base code into the keypad and gets back an index listing the major subject areas in the data base — each of which is individually numbered. He

then inputs one of these numbers and receives a display showing the subtopics within the subject area.

Generally, after repeating this process once or twice more, he reaches the information desired. Typically, it would consist of restaurants within a given geographic area serving a particular cuisine within a given price range.

Viewtron Applications

Viewtron supports a wide variety of applications — restaurant and theater listings, home shopping services enabling the viewer to compare prices offered by competing stores and order items on-line, travel and theater ticketing services, home banking, news, weather and sports reports. The Austin trial, at least initially, will provide only the last of these, in addition to telephone directory and personal data base services.

A major goal of the test, apparently, is to determine whether an electronic information service can supplant printed telephone books and information operators — both of which are becoming increasingly expensive, the phone company said.

In France, an electronic directory terminal providing access to subscriber names and numbers — as well as supporting services like those included in the Viewtron trial — is being given away, free to telephone subscribers.

a locker by the company's deliveryman, he inputs the customer's account number into the microprocessor. The customer retrieves 'the item afterward by feeding a company-issued credit card into a reader connected to the microprocessor. If the codes on the card agree with those previously input by the deliveryman, the locker opens automatically.

During the upcoming Velizy test, La Redoute plans to maintain a list of delivered orders and the related locker numbers in its Teletel data base. This will allow customers to use the system to find out when their purchases are ready to be picked up. A major goal of the French program is to develop on-line systems for small business firms, Bright explained. The inverted file structure developed for the electronic telephone directory application, he pointed out, can be used without major changes to support inventory control and order processing applications.

Several peripherals are being developed that are intended to make the directory terminal even more useful for business applications. These include a facsimile photocopier, communicating word processor and a telewriter — a device for converting handwritten text and graphics into a binary code that

can be transmitted by a standard voice-grade telephone circuit.

All of these devices are scheduled to be available in France within the next year, Bright said, and marketing opportunities in other countries are being intensively explored. The 3M Co. has already acquired marketing rights to one of the facsimile machines; developed by Thomson-CSF, it transmits a full page of text in 40 seconds to two minutes and will cost about \$500.

Two French firms — Flonic Schlumberger and CII Honeywell Bull — are developing the "smart" credit card. It is expected to become commercially available late next year.

Sees 'Disastrous' Consequences

Group Blasts Ruling Forcing Union on DPers

By Jeffry Beeler

CW West Coast Bureau SAN FRANCISCO — A nationwide organization of programmers and system analysts last week formally condemned a recent federal government decision forcing nonsupervisory management information systems (MIS) personnel at Western Airlines, Inc. to join a labor union.

The Association of Computer Programmers and Analysts (Acpa) warned the decision could have "disastrous" consequences for a wide range of large businesses and urged the government to reconsider its position in the Western Airlines case.

The organization, which claims 574 members throughout the U.S., voiced its dissent in a three-page statement drafted by its board of directors and formally approved here during the opening day of the association's tenth annual conference.

Based in E. Greenwich, R.I., the Acpa is believed to be the first professional trade organization to take a formal position in the Western Airlines controversy, which erupted last summer when an independent federal agency known as the National Mediation Board (NMB) ruled that programmers and system analysts qualify as clerical or office personnel and therefore deserve to be unionized [CW, Aug. 18].

NMB's ruling was prompted by a petition filed last May by the Brotherhood of Railway and Airline Clerks (Brac), an international labor union that had sought for months to extend its control to Western Airlines' formerly nonunionized computing shop.

In its petition, Brac argued that nonsupervisory MIS personnel belong to the "clerical class or craft" as described by the Railway Labor Act, which was written in part to define the scope of the union's authority. NMB agreed with Brac's argument, OK'd its petition and thus opened the way for the Western Airlines computing staff to be unionized — all of which was apparently undertaken without the employ-

Postal Service Nixes Zip Delay

WASHINGTON, D.C. - The U.S. Postal Service intends to go ahead with its nine-digit Zip Code plans despite the protest of more than 120 members of Congress.

In an Oct. 3 letter to Rep. Richardson Preyer (D-N.C.), Postmaster General William F. Bolger said it would be detrimental to the Postal Service and its customers to delay implementation of the new codes, scheduled for February. Preyer and his colleagues had asked for the delay Oct. 2, saying the Postal Service has not supplied sufficient information on cost to the postal service and the public of the new codes [CW, Oct. 13].

Bolger's response stated his belief 'the Postal Service has carefully studied the impact of our plan to expand the Zip Code, including the financial, technical and social aspects.

While some problems may develop as we move further into our expansion program, I believe that the advantages for this nation far outweigh any disadvantages espoused," Bolger wrote.

ees' prior knowledge or consent. Since then, the Acra has drafted a resolution "deploring" NMB's lack of consultation in the case and 'strongly" opposing its recent decision on several grounds. In the long run, the statement warns, the federal agency's ruling could have a "disastrous" effect on the ability of many business computing departments to hire and retain skilled MIS profes-

The market demand for competent, professional analysts and program-mers, coupled with their independent nature, is such that they would be hesitant to work for any employer who required them to submit to a union

agreement," the association said. "Employers are well aware of the reputa-

W at Acpa

tion analysts and programmers have for leaving a company if they are not satisfied with working conditions.

The Acpa's statement also disputed NMB's contention that programmers and system analysts exercise little or no management authority and there-fore belong in the same job category as clerical and office workers.

No clerical and few nonsupervisory positions have the potential for as much impact on the success or failure of a business as has the analyst or programmer," the statement argued.
"Many analysts or programmers are either explicitly or implicitly charged with responsibility for effective management and utilization of the corporate information resource. This is not a light responsibility."

Another reason Acpa opposes NMB's recent decision is that it is allegedly based on ignorance of basic analyst and programmer psychology. The statement cites recent motiva-tional studies that show computing professionals have an unusually strong drive for professional growth and on-the-job stimulation.



Why Choose Tape? 3420-Type Units Profiled

A potential tape drive purchaser has a broad choice to select from. Datapro observed. In some ways this makes the final decision more difficult since some independent-produced drives not only match the performance of the various IBM models but also offer different standard features, the report noted.

For example the dual-density feature is standard on various drives from Memorex, NAS, Braegen and Telex while STC and IBM specify that dual density is an option.

Variations are also present among the number of controller switch options and channel switch options offered by IBM and its plug-compatible competi-

Both of these features can provide flexibility and, possibly, economy if utilized correctly, according to the re-

Controller Switch Option

The controller switch options permit a degree of flexibility by switching a group of drives among several control-lers, Datapro noted. Thus, reconfi-guration in mixed-format or mixedspeed environments can take advantage of the computer's I/O paths. The first number used in the chart notations identifies the number of controllers that can be in the switch group and the second number shows the maximum number of drives that can be switched.

A tape subsystem can be switched under program control between multi-ple processors via the channel switch options, according to the study. This allows operating economies to be achieved in some cases by sharing tapes among multiple processors in the same facility, Datapro noted.

Another standard feature available from Memorex addresses the problem of identifying a tape that has become contaminated to the point where it cannot be read and the stored data is, in effect, lost. In order for tape operations to function effectively, Datapro pointed out, constant operator vigilance is required to keep the tape itself in good condition.

The Memorex tape maintenance monitor automatically stamps a red mark on the back of the reel after a predetermined number of unsuccessful write attempts have been made. The maximum number of write errors is 32 for 1,600 bit/in. density and 96 for 6,250 bit/in., according to a Memorex spokesman.

The red mark alerts the operator to the fact that the data on that particular reel should be copied to a new reel. While the process is still somewhat operator-dependent, it has merit when compared to IBM's system of printing this type of information on the system log record, he claimed.

Subsystem Compatibility

Another factor to keep in mind when shopping among PCM wares is that none of the five vendors shown in the charts offers a drive compatible with the mainframe controller. It is necessary in every case to purchase the PCM's controller along with its asso-ciated drives, and this naturally involves a considerable expense.

Why this insistence on subsystem compatiblity rather than, as Datapro described it "component compatibil-

ity"? Basically, the PCMs are selling the controller electronics, a Datapro representative said. And, given the maintenance problems that plague this medium, tape drive component compatibility may be more difficult to successfully achieve than it is for disk

The study warned that although all of the PCMs' products adhere to IBM's standards, this does not guarantee in and of itself that the tapes recorded on an IBM drive can be read on an independent drive nor that the converse is true. However, all drives that use a particular recording format can normally be adjusted to be compatible with one another, Datapro said. The report recommended specifying this compatibility adjustment in the contract if it is critical to an operation. Listed prices are subject to change,

Since IBM recently announced a significant price reduction on three members of its 3420 family, models 4, 6 and 8 [CW, Oct. 13], industry observers expect most PCMs to follow suit. Datapro felt that hard negotiation could often result in paying less than the amounts shown, particularly if the user representative is in an easy-toservice geographical area or represents a prestige account.

Characteristics	IBM 3420 Model 31	Storage Technology Corp. 3430 ²	Telex Computer Products, Inc. 8020-3	
Attachment via Mainframe Controllers	3803-1	No	No	
Attachment via Independent Controllers		STC 3800-III	Telex 8803-2	
Drive/Controller	1-16	1-8	1-8	
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2 by 16	
Channel Switch Options	Optional, 2 Channels	2 Channels	2 Channels	
Recording Characteristics	7-Track: 556- or 800 bit/in.; 9-Track: 1,600 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 200-, 556 or or 800 bit/in.; 9-Track: 800- or 1,800 bit/in.	9-Track: 800- or 1,600 bit/in.	
Mode Compatibility?	No	Optional	Optional	
Transfer Rate (byte/sec)	7-Track: 41.7 or 60; 9-Track: 60 or 120	7-Track: 15, 41.7 or 60; 9-Track: 60 or 120	60 or 120	
Rewind Time (2,400 ft)	- 60 Sec	65 Sec	60 Sec	
Purchase Price	\$14,340/Drive; \$24,850/3803-1	\$16,610/Drive; \$23,200/3800-II	\$12,640/Drive; \$21,040/8803-2	
Monthly Lease Charges (2-Year Lease Incl. Maintenance)	\$410/Drive; \$713/3803-1	\$407/Drive; \$600/3800-II	\$535/Drive; \$913/8803-2	
Maintenance included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 5 Day/Week	

^{1.} Dual-density and seven-track features are optional.

Tape speed for all models is 75 in./sec, and all models offer read backward capability.

Characteristics	IBM 3420 Model 41	Storage Technology Corp. 36301	Telex Computer Products, Inc. 8020-4
Attachment via Mainframe Controllers	3803-2		No -
Attachment via Independent Controllers	-	STC 3800-IV	Telex 8803-2
Drive/Controller	1-8	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	2 Channels	2 Channels
Recording Characteristics	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.
Mode Compatibility?	No	Optional	Optional
Transfer Rate (byte/sec)	120 or 470	120 or 470	120 or 470
Rewind Time (2,400 ft)	60 Sec	65 Sec	60 Sec
Purchase Price	\$18,440/Drive; \$33,110/3803-2	\$23,700/Drive; \$38,635/3800-IV	\$15,320/Drive; \$21,040/8803-2
Monthly Lease Charges (2-Year Lease Incl. Maintenance)	\$572/Drive; \$1,037/3803-2	\$526/Drive; \$870/3800-IV	\$503/Drive' \$913/8803-2
Maintenance Included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 7 Day/Week

Dual-density is optional; seven- and nine-track features available with 3803-2.

Tape Beats Disk in Some Environments

Portability.

System-to-system compatibility. The ability to store large volumes of

data

Combined with the increasing need for permanent backup on large-capacity fixed disk drives, these are the factors that make tape storage media preferable to disk drive storage in certain environments, according to a specialist in capacity planning for large systems.

For a comparison of Model 7and Model 8-compatible versions of the IBM 3420 - and an idea of when IBM will announce its next tape drive family, codenamed Ocotillo - turn to Page 12.

Bob Monnette, a consultant with Cheshire Associates in Chicago, did agree with Datapro Research Corp. that, compared with tape, disk does have performance advantages. Enumerated in a Datapro study entitled
"All About Plug-Compatible Tape Drives," these advantages include the facts that sequential file updating plays a less dominant role in DP systems now and disk packs provide a recording medium that is easier to main-

tain than tape. However, "until most installations have implemented common data communication," the requirement remains for a storage medium such as tape that is easily portable, Monnette main-

tained.

Diskettes are not necessarily an acceptable alternative in all cases because they usually can not hold a large volume of data, he observed. Diskettes are often limited to carrying several kilobytes of data as opposed to one volume of tape which can easily store 100M bytes on one 2,400-foot reel.

Easy Disaster Recovery

One other advantage of this medium is that it is archival in nature, which makes for easier disaster recovery, according to the consultant. While mass storage systems such as the IBM Model 3850 fill this need for some in-stallations, they were built around an older technology and could result in floor space problems because of their large "footprint."

The apparent industry commitment to relatively new data base concepts may ironically increase the acceptance of tape as a backup medium. "The information stored within a data base requires a lot of space, Monnette said. Until a data base concept is developed that involves lower volumes of data, there is "no way to get away from

The physical constraints involved in either speeding up today's tape drives or packing the data more closely led Monnette to indicate that he did not predict any "radical changes" in the near future involving tape technology.

The drive functions to move a flexible medium across the read/write head at such a speed that air is actually treated as a fluid. Speeding up today's drives to move the tape faster across this head would mean a significant breakthrough, he said.

Device	IBM 3420 Model 5 ¹	Braegen Corp. 345 ²	Storage Technology Corp. 3450 ³	Telex Computer Products, Inc. 8020-5
Attachment via Mainframe Controllers	3803-1	No	No	No
Attachment via independent Controllers	7	Braegen 1040, 1040A	STC 3800-III	Telex 8803-2
Drive/Controller	1-8	1-8	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	Optional, 2 Channels	2 Channels	2 Channels
Recording Characteristics	7-Track: 556- or 800 bit/in.; 9-Track: 1,600 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 200-, 556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 200- 556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	9-Track: 800- or 1,600 bit/in.
Mode Compatibility?	No	Standard	Optional	Optional
Transfer Rate (byte/sec)	7-Track: 69.5 or 100; 9-Track: 100 or 200	7-Track: 25, 69.5 or 100; 9-Track: 100 or 200	7-Track: 25, 69.5 or 100; 9-Track: 100 or 200	100 or 200
Rewind Time (2,400 ft)	60 Sec	60 Sec	55 Sec	60 Sec
Purchase Price	\$19,230/Drive; \$24,850/3803-1	\$2,500/Drive; \$2,500/Controler	\$21,270/Drive; \$23,200/3800-III	\$14,200/Drive; \$21,040/8803-2
Monthly Lease Charges (2-Year Lease Incl. Maintenance)	\$551/Drive; \$713/3803-1	\$315/Drive; \$342/Controller	\$520/Drive; \$600/3800-III	\$484/Drive; \$913/8803-2
Maintenance Included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 5 Day/Week

Dual-density and seven-track features are optional.
 Seven-track feature is optional.
 Dual-density is optional.

Tape speed for all models is 125 in./sec, and all models offer read backward capability.

Device	Model 61	Memorex Corp. 3226	Storage Technology Corp. 3650 ²	Telex Computer Products, Inc. 8020-6
Attachment via Mainframe Controllers	3803-2		No	No
Attachment via Independent Controllers	-,3	Memorex 3221, 3222	STC 3800-IV	Telex 8803-2
Drive/Controller	1-8	1-16	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	2, 3 or 4 Channels	2 Channels	2 Channels
Recording Characteristics	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bit/in.
Mode Compatibility?	No	A -	Optional	Optional
Transfer Rate (byte/sec)	200 or 780	200 or 781	200 or 780	200 or 780
Rewind Time (2,400 ft)	60 Sec	50 Sec	55 Sec	60 Sec
Purchase Price	\$21,540/Drive; \$31,110/3803-2	\$28,810/Drive; \$39,420/3221; \$78,840/3222	\$27,385/Drive; \$38,635/3800-IV	\$16,440/Drive; \$21,040/8803-2
Monthly Lease Charges (2-Year Lease Incl. Maintenance)	\$662/Drive; \$1,037/3803-2	\$663/Drive; \$925/3221; \$1,850/3222	\$594/Drive; \$870/3800-IV	\$588/Drive; \$913/8803-2
Maintenance Included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	9 Hour/Day, 5 Day/Week

Dual-density is optional; seven- and nine-track features are available with 3803-2.
 Dual-density is optional.

IBM's Ocotillo — A Glimpse Into the Future

CW Staff

What can we expect to see in the new family of tape drive products expected

to be announced by IBM before the end of the year?

Code-named Ocotillo [CW, Aug. 18], the new series could represent

Device Characteristics	IBM 3420 Model 71	Braegen Corp. 347°	Memorex Corp. 3227°	Hational Advanced Systems 7426-77	Storage Technology Corp. 3470*	Tolex Computer Products, inc. 8420-7°
Attachment via Mainframe Centrollers	3003-1	No	-	-	No	No
Attachment via independent Controllers	-	Braegen 1040, 1040A	Memorex 3221, 3222	NAS 7803-21	STC 3600-III	6803-1
Drive/Controller	1-8	1-0	1-16	1-8	1-8	1-8
Controller Switch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	2, 3 or 4 by 16	1 or 2 by 8 or 16	2, 3 or 4 by 16	2 by 16
Channel Switch Options	Optional, 2 Channels	2 Channels	Optional, 2 Channels	2 Chennels	2 Channels	2 Channels
Recording Characteristics	7-Track: 556- or 800 bit/in.; 9-Track: 1,800 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 200-, 556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	9-Track: 800- or 1,600 bit/in.	9-Track: 800- or 1,800 bit/in.	7-Track: 200-, 556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.	7-Track: 556- or 800 bit/in.; 9-Track: 800- or 1,600 bit/in.
Mode Compatibility?	No	Standard	-	-	Optional	Optional
Transfer flate (byte/eec)	7-Track: 111.2 or 160; 9-Track: 160 or 320	7-Track: 40, 111.2 or 160; 9-Track: 160 or 320	160 or 320	160 or 320	7-Track: 40, 111.2 or 160; 9-Track: 160 or 329	7-Track: 40, 111.2 or 160; 9-Track: 160 or 320
Rewind Time (2,400 R)	45 Sec	45 Sec	52 Sec	45 Sec	45 Sec	60 Sec
Purchase Price	\$21,540/Drive; \$24,850/3803-1	\$3,000/Drive	\$20,000/- Drive; \$39,400/- 3221; \$78,840/- \$3222	Not Available	\$23,300/Drive; \$23,200/- 3800-31	\$7,500/Crive; \$9,500/6803-1
Monthly Lease Charges (2-year Lease Incl. Maintenance)	\$653/Drive; \$712/3803-1	\$386/Drive; \$386/- Controller	\$774/Drive; \$925/3221; \$1,850/- 3222	Not Available	\$600/Drive; \$600/3600-III	\$348/Drive; \$404/6803-1
Maintenance Included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	24 Hour/Day, 7 Day/Week	Not Available	24 Hour/Day, 7 Day/Week	9 Hour/Day. 7 Day/Week

straight replacement for the 3420-type drive with a higher density and speed," speculated a representative of International Data Corp. (IDC), the market research firm in Waltham,

Another possibility is a tape streamer device; still a third possibility is a wide-track drive that might handle as many as 18 tracks with up to 20,000

bit/in., he said. When does he expect the formal IBM announcement? Perhaps as early as the fourth quarter of 1980, although he

felt the first quarter of 1981 is a stronger probability.

One thing the new drives probably won't be is a continuation of the 8809 tape unit, the IDC spokesman said.
The 8809 is generally viewed as a limited-use drive designed for fast dump and restore capabilities to back up fixed disk drives, he explained.

IBM seems to have recognized this; it began deemphasizing the 8809 with its announcement of the 4331 Group 2 processor in May, the IDC spokesman

Device Cheracteristics	IBM 3430 Model 8'	Memorex Corp. 3226	National Advanced Systems 7420-88	Storage Technology Corp. 3670'
Attachment via Mainframe Controllers	3803-2	-	No	No
Attachment via Independent Controllers	-	Memorex 3221, 3222	NAS 7803-21	STC 3800-IV
Drive/Controller	1-8	1-16	1-8	1-8
Controller Bwitch Options	2, 3 or 4 by 8 or 16	2, 3 or 4 by 16	1 or 2 by 8 or 16	2, 3 or 4 by 16
Channel Switch Options	Optional, 2 Channels	2, 3 or 4 Channels	2 Channels	2 Channels
Recording Characteristics	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,600- or 6,250 bis/in.	9-Track: 1,600- or 6,250 bit/in.	9-Track: 1,800- or 6,250 bit/in.
Mode Competibility?	No		- 000	Optional
rensfer Nate (byte/sec)	320 or 1,250	320 or 1,250	320 or 1,250	320 or 1,250
Rewind Time (2,400 R)	45 Sec	45 Sec	45 Sec	45 Sec
Perchase Price	\$23,890/Drive; \$33,110/3803-2	\$31,600/Drive; \$39,420/3221; \$78,840/3222	Not Available	\$30,120/Drive \$38,635/3800-rv
Monthly Lease Charges (2-Year Lease Incl. Maintenance)	\$786/Drive; \$1,037/3803-2	\$774/Drive; \$925/3221; \$1,850/3222	Not Available	\$690/Drive \$670/3600-IV
Maintenance Included With Basic 2-Year Lease Plan	24 Hour/Day, 7 Day/Week	24 Hour/Day. 7 Day/Week	Not Available	24 Hour/Day. 7 Day/Week

Tape speed for all models is 200 in./sec, and all models offer read backward capability.

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Navy's Pay System Seen Taxpayers' Nightmare

CW Washington Bureau

WASHINGTON, D.C. - A classic example of "garbage in, garbage out," is costing American taxpayers millions of dollars per year in overpayments to U.S. Navy personnel.

The Navy's error-riddled centralized automated pay system, developed and operated over the last 12 years at a cost of \$150 million, is "largely unreliable and inefficient," the General Accounting Office (GAO) reported recently.

The problem, according to the auditing agency, has nothing to do with the hardware or software of the system, but instead involves the human operations supporting it.

"Most of the pay computed by the system is based on erroneous and/or outdated information" that must be double checked by "an expensive, un-approved parallel manual system" to assure the Navy's 522,000 active personnel are paid correctly, GAO found.

Every payday, the manual backup system finds more than 50% of the centrally computed payments are in error and have to be overridden at Navy disbursement offices. Despite these overrides, however, many errors are still found in paychecks, GAO

Errors Mean Millions

The errors, while including numerous underpayments to servicemen, are costing millions, the GAO said. On a systemwide basis, the agency said, a March 1979 sampling of Navy pay

N.Y. Marathon: System Gets Set

NEW YORK - An estimated 13,000 runners are expected to cross the New York Marathon finish line next Sunday in what is being billed as the largest athletic event ever scored by a computer.

The scoring system - a mixture Intel Corp. of microcomputers and Data General Corp. minicomputers - is capable of tracking more than 100 runners per minute as they cross the finish line and gives times accurate to the nearest hundreth of a second, a spokeswoman said.

When a runner crosses the finish line on Oct. 26 in one of three lanes, a race official will push a button recording the exact moment. This information is transmitted to one of two microcomputers located in a van parked close to the finish in Central Park.

In case of a heavy surge of runners at the finish, a second official will be on hand to enter data on a hand-held terminal linked to both micros, the spokeswoman explained.

The runners' times will also be recorded by a third official who will also have a button connected to both microcomputer systems.

The microcomputers will store the finishing data in nonvolatile memory and also send it via a private line to a DG Eclipse C/350 minicomputer located at Personnelmetrics, Inc. A pair Timeplex, Inc. multiplexers will handle the micro-to-mini transmissions and the main minicomputer will be backed up by a DG Eclipse C/330

accounts found an estimated \$27.5 million in errors. In fiscal 1978 alone, overpayments to about 17,000 selected personnel totalled approximately \$4.2 million, the report said.

The "major problems of the system" are blamed by GAO on "the lack of timely and accurate input data from field organizations to the central com-

Approximately 400 disbursing offices located worldwide collect and ransmit pay change information in the form of optical character recogni-tion documents, which are batched and mailed from local field administrative offices. Large facilities transmit the data to the computer center in Cleveland on magnetic tape.

Most of this data takes an average of

23 days for input, including 12 days of preparation and seven days in the The system design originally called for only three days of preparation, GAO noted.

Besides being late, the quality of the input is very poor," the audit report added. Approximately 250 clerks at the central site resolve an average of 38,000 errors rejected by the system every month — costing the Navy \$3.4 million per year.

This amounts to about 8% of pay change transactions submitted every month, the report said. "And in 17% of those cases, the corrections made by the clerks are rejected and the errors must be corrected again.

The obvious answer to most of these problems, GAO pointed out, is to

speed up preparation and input of pay data. The Navy assured the GAO field activities are being reorganized to that end, a reorganization set for completion by the end of this year.

In addition, beginning in the fall of 1981, the Navy will have its major domestic installations transmit pay data electronically rather than through the mail. And by 1984, a more sophistitelecommunications network will allow about 68% of the data to be transmitted electronically.

The GAO said it approves of these changes but recommended the Navy immediately step up management oversight of the field operations to reduce input errors so it can reduce reliance on its manual backup to eliminate the expensive parallel operation.

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Computers Seen Displacing Jobs Faster Than Creating Them

By Nancy French CW Staff

MELBOURNE, Australia — Although new jobs are being created as a direct result of computer automation, they are in nowhere near the same number of those eliminated in four categories studied by U.S. computer scientists, according to a paper prepared for the Eighth World Computer Congress of the International Federation for Information Processing (Ifip 80) here last week.

Prepared by Dr. Bruce Gilchrist of Columbia University's Center for Computing Activities, the paper is aimed in part at trying to describe ways in which employment problems caused by computers are being mitigated, Gilchrist said.

On the positive side, the number of U.S. jobs created directly in the manufacture and use of computers probably approaches three million or close to 3% of civilian employment, he said.

At the same time, however, serious job displacement is occurring. Of four industry areas surveyed — telephone, telegraph, typesetting and su-

CW at Ifip 80

permarkets, typesetting jobs have been affected most, Gilchrist contended.

Between 1966 and 1978 in New York City alone, he said, the number of journeymantypesetters declined from 7,993 to 3,851, and the number of apprentices declined even "more precipitiously" from 498 to 11.

Of the 1,000 typesetters who lost their jobs in a recent twoand-one-half year period, one third retired, leaving the other two thirds to find jobs in other fields.

Telephone Industry

In the telephone industry, for example, between 1972 and 1977 "the average number of telephone calls handled by the Bell System increased 21% from 420 million to 510 million, while the number of operators declined by 32%, from 149,000 to 102,000, Gilchrist said.

Because of the relatively high turnover rate in these jobs, however, the reduction was accomplished through attrition, he said.

In the telegraph industry, the number of telegraphists represented by membership in the United Telegraph Workers has been cut in half since 1967, from 20,000 to 10,000.

The principal reason was Western Union's move to computer-based operations and its reduction in the number of telegraph workers.

Here, most of the laid-off workers have been married women and most of those retained are computer technicians and console controllers, he said.

Supermarket Scanners

Supermarket employees, where scanners have been installed, have been affected less, according to Gilchrist's data. But as many as 45,000 to 60,000 out of a possible one million full-time equivalent jobs could be lost by 1987 or 1988, he estimated.

The high turnover rate and extensive use of part-time employees in this industry "makes it unlikely that anyone will actually be laid off due to scanners," he said.

"Instead, the impact will be felt by individuals who find it harder to obtain the relatively unskilled jobs typical of su-

permarkets, such as minorities and young people where unemployment is already high," he pointed out.

Going back to typesetters, Gilchrist said most of those displaced have been "unable to find jobs comparable to those they had lost," and many had to take pay cuts of 50% or more.

These workers found unemployment difficult to endure for several reasons — they were middle-aged, they had mortgages to pay and families to support and were laid off from relatively high-salaried unionized positions, and they had skills that were outdated and unwanted, he said.

Approaches to Problem

Gilchrist's review of the four basic approaches to the problem — job protection, redundancy payments, retraining programs and public assitance payments — was gloomy at best.

Job protection, called for in union contracts, tends to endanger the viability of the businesses involved, he said. If an enterprise is forced out of business because its labor costs are higher than those of its competitors, a "no layoff" clause is of little use, he added.

Redundancy payments also can cause a business to become less and less competitive with the same result as the no

Retraining programs sponsored by the government have never actually been used to retrain middle-aged workers, he said. However, one program operated by the International Printing and Graphics Communications Union in Seattle did successfully train printers in small equipment repair and surveying.

Register Set To Match DPers, Job Prospects

ST. LOUIS, Mo. — The Ninth Annual Employment Register will be conducted at the 1981 Computer Science Conference here on Feb. 23-

The conference is being jointly sponsored by the Association for Computing Machinery (ACM) and the computer science departments of several universities.

The Employment Register strives to match computer scientists and information processing specialists with employment opportunities.

Registration forms should be filed by Jan. 26.

Details can be obtained from Orrin E. Taulbee, the Department of Computer Science, University of Pittsburgh, Pittsburgh, Pa. 15260.

DECEMBER 1MS CLASSES?

With everyone thinking about the holidays and budgets running low, who would offer public IMS classes in December?

Informatics Data Base Specialty Services would. We've been so busy this year that we've only had time to teach private on-site classes and some of the biggest and best IMS shops in the country have experienced the benefits of our Instructor/Consultant approach. In December we have a breather before an already heavily booked 1981 (our clients run out of budget, too!), and this makes December your best opportunity to try the highest quality IMS education in the country on a 'seat at a time' basis. The offerings are:

Class	Per Student Price	Location	Date(s)
Fundamentals of IMS/VS	\$200	Dallas	12/1
		San Francisco	12/8
IMS/VS Basic Programming	\$325	Dallas	12/2-3
		San Francisco	12/9-10
IMS/VS Advanced Programmir	g \$325	Dallas	12/4-5
		San Francisco	12/11-12
Programming for MFS	\$500	Houston	12/10-12

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Especially on Jobs

Australians Seen Worried by Computers' Impact

By Nancy French CW Staff

MELBOURNE, Australia — The fact that Australia and its all-powerful unions are afraid of the impact of computers on society — primarily jobs — was nowhere more apparent than in the keynote address delivered at the opening of the International Federation for Information Processing's (Ifip) Eighth World Computer Congress here last week.

In his remarks, His Excellency, Sir Zelman Cowen, governor general of the Commonwealth of Australia (appointed by the Queen of England), related that fear to a lack of public understanding of computers, their potential benefits and the skills needed to use them.

At the same time technology is making demands for new expertise, the education system here is failing to produce computer-literate individuals, he told an audience estimated at 1,200.

The crowd had gathered here for Part 2 of this triennial world conference sponsored by Ifip. Part 1 was held in Tokyo the week before.

Committee on Change

Referring to the findings of a study published recently by the Australian Committee on Technological Change, Cowen noted that a high proportion of secondary school students choose to take few or no physical sciences courses. The typical primary school teacher has a poor mathematical background and thus turns out poorly prepared pupils, he said.

In his speech, Cowen also called on Australian firms to become aware of and take advantage of computer technology to regain or retain their international competitiveness and to ensure they are handling their information ecnomically and efficiently.

CPU Failure Halts Trading

NEW YORK — Trading at the New York and American Stock Exchanges was halted for the longest period in more than five years last week when a computer failure brought activity on the Big Board to a standstill for 54 minutes.

The hardware malfunction, which ocurred at 10:58 a.m. last Monday, caused the system to automatically switch to a backup system, which also failed. Both exchanges shut down at 11:11 a.m., and the Chicago Board Options Exchange was halted two minutes later. Action was resumed at 12:05 p.m.

Although trading was disrupted, the breakdown occurred on Columbus Day holiday, when trading was not particularly heavy.

The problem stemmed from "multiple hardware failures" in the market data system, which controls the stock tickers and reports on trades as they occur, according to a New York Stock Exchange spokesman. Usual recovery time is one-and-a-half minutes, but because the normal indicators did not work because of the dual set of failures, extensive checking was needed before the system was operational.

He also warned that Australia is rapidly becoming totally dependent on imported computing gear. Such a dependency could leave the country seriously vulnerable at a time of international crisis, he pointed out.

While Cowen was speaking here, reporters at the Sydney, Australia, Herald newspaper were staging a work stoppage to underscore their demands for greater pay in the face of automation. Since the typesetters' jobs were eliminated by the installation of CRT terminals, the reporters' union believes its workers should be paid more for performing functions on the terminals that previously occurred in the typesetting operation.

The lack of understanding of the importance of mathematics and science has obvious significance in the context of the training and education of a community dependent on a computer technology, Cowen said.

It is also important to a general community understanding of the significance and impact of computing, he

The impact of the computer revolution on society has been universal, he said, adding that few areas of human activity have, so far, been untouched.

Quoting the report, he said, "Industrial processes will increasingly be controlled by computers. Work is already performed by robots. Even farming can be automated.

"The commercial world of banking, insurance and retailing is being transformed. Transport and communications are undergoing computergenerated changes. Government and administrative activities are now different

"Even education and medicine are not unaffected. Moreover, wherever man is standing on the frontiers of science, computer power is assisting in the making of new discoveries," Cowen said.

Once established, computer systems

are effectively irreversible, he said. The impact on employment and on the character of employment is very im-

CW at Ifip 80

portant.

Citing the account of the introduction of computers at Qantas Airlines by Sir Lenox Hewit, Cowen said, "Widespread use of computerized information systems could attract significant opposition. Bitter industrial disputes have been brought about by the introduction of new technology and a fear of the unknown. A little extra effort in educating staff can pay enormous dividends in the effectiveness of the ultimate system.

"At the earliest [the design] stage, those slated to use a computer system in Qantas and particularly their supervisors were consulted. A supervisor who knows the details of the proposed system, has been consulted in its design and is convinced of its value, can usually convince his staff. If a supervisor is not convinced of the merits of a new system he looks for errors in its design."



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Patco Drumming Up Strike Support: FAA

WASHINGTON, D.C. - The Federal Aviation Administration (FAA), fearing a controller walkout next March [CW, Oct. 13], has charged that recent publicity about air traffic control (ATC) computer failures is simply an attempt by controllers to shore up public support in case of a strike.

The Professional Air Traffic Controllers Organization (Patco), however, denies that accusation. "The FAA is leveling charges that our actions in reporting computer problems are simply motivated because we're trying to put the heat on them with reference to getting into our contract negotiations, according to Patco member Ron Levesque at Tampa (Fla.) Airport.

That is an out-and-out bald-faced lie," Levesque claimed. "The problems we're having with our computer at Tampa are real; our reporting them was prompted by nothing other than the fact that we had a bad situation and didn't want to live with it anymore, and wanted to do something to get it fixed.

Public Issue

Tampa went public last winter with problems associated with its prototype Arts III-A system, installed in May 1979 [CW, Feb. 11]. Besides claiming the system failed far too often, controllers complained about its propensity to track not only airplanes, but in some cases highway trucks and railroad

As evidence that controllers' public complaints were "no union ploy," but rather dealt with "safety, period," Levesque noted that the Tampa group went public on Jan. 8 and "the next day we had a troupe of about 20 highpowered specialists from Univac, the National Aviation Facilities Experimental Center, all levels of the FAA, Magnavox and a whole bunch of other gee-whiz kids down there

They were there almost around the clock for two months - it took them that long to find out what the problem was," Levesque recalled. "And only because they came did the computer even improve at all, because the local folks just didn't have enough training or knowledge to search out and investigate what the problems were.

Levesque also noted that the Tampa group had no help from its regional Patco office or from national headquarters

O'Hare Slowdown

A recent traffic slowdown at O'Hare International in Chicago that, according to controllers, was caused by windy conditions, a bad runway configuration, low staffing and heavy traffic, has been legally challenged by the FAA as an international action

aimed at manipulating the agency.
"Prior to negotiations with the FAA, Patco has been involved in a number of actions - it's absolutely nothing new," FAA spokesman Jerry Lavey maintained. "[Patco] may say they are pointing out certain problems, but we can interpret the [O'Hare] slowdown in no other way.

Back in 1975, 63 O'Hare Patco members filed a lawsuit against the FAA,

the Civil Service Commission and the Department of Labor, seeking a new ATC computer backup system and new software testing procedures [CW, March 20, 1978].

Other demands included a 32-hour workweek (O'Hare controllers now work six-day weeks), a halt to understaffing of journeymen controllers and an update of the training program. The trial took place in January 1978

and a decision is still pending.
Reached last week, a law clerk for Judge John Powers Crowley, the judge who presided over the trial in Federal District Court of the Northern Illinois District, said she didn't know when a decision will be made in the case

My face is red," the law clerk said. It's out of my control; there's no information I can give you on that. The judge decides things in the order he feels is appropriate. There are explanations, but I don't know what they are.

While O'Hare controllers are highly dissatisfied with conditions that have remained nearly the same as before they filed suit, they deny the August slowdown had anything to do with their demands or contract negotia-

"The FAA is looking for ghosts that are not there," contended O'Hare Patco president Richard Scholz. "They finally decided they found a ghost, and then they charged us with all these illegal job actions." A trial on the illegal slowdown charge will be held in De-

The FAA would like nothing more than to cover up the shortcomings of the [ATC] system by blaming safety-related issues on the fact that Patco does have contract negotiations coming up," commented Dominic Torchia, Western Region president.

When I talk labor/management relations and contracts, that's what I'm taking about," he added, "and when I talk about safety, that's what I'm talking about.

You can't totally divorce air safety from some of the problems we face as far as working conditions go, but the problems are real, the computer failures are documented and I've testified myself in front of four different congressional or senatorial hearings," he

"The FAA is hell-bent on destroying our union," Torchia claimed.

'Corporate EFT Report' **Begins Publication**

NEW YORK - "Corporate EFT Report," an independent newsletter for bankers and cash managers, recently began publication here.

The eight-page bimonthly is a com-panion to the "EFT Report," a threeyear-old electronics funds transfer newsletter. While the new publication will continue to deal with issues involving consumer electronic banking, Editor Sid Goldstein said that "Corporate EFT" will specialize in electronic banking services for corporate cus-

Yearly subscription to the "Corporate EFT Report" is \$450. Details are available from the publisher at 51 E. 42 St., New York, N.Y. 10017.



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FCC, Congress Powerless To Hold Bell Accountable, Former FCC Chief Warns

By Phil Hirsch

CW Washington Bureau
HOLLYWOOD, Fla. — Neither Congress nor the Federal Communications
Commission (FCC) has ever been able
to "hold the Bell System accountable
either to its customers, its competitors
or its regulators," and the prospects

for the future are not very encouraging, according to Walter R. Hinchman, former chief of the FCC's Common Carrier Bureau.

Addressing the annual meeting of the North American Telephone Association (Nata), which convened here recently, Hinchman said "the monopolistic ambitions and predatory practices of the telephone industry cartel continue to constitute a grave threat to the evolution of truly competitive markets in telecommunications and information services and equipment."

But "some public officials seem unable or unwilling" to recognize this threat, and the FCC "seems to have lost the will and perhaps the ability to continue holding the cartel at least partly accountable for predatory prac-

Call for Divestiture

The only "realistic" means of protecting consumer interests and preserving competitive opportunities in telecommunications is to break up the Bell System through divestiture, Hinchman contended. The "fully separated subsidiary" scheme incorporated into the legislation Congress considered this year won't work, because the subsidiaries will continue "to receive policy direction from and owe allegiance to the AT&T holding company management."

Furthermore, by allowing AT&T to operate these subsidiaries free of regulation, both the FCC — in its Computer Inquiry II decision — and Congress have given AT&T an incentive to transfer many of its existing monopoly services to an unregulated subsidiary,

The phone company will be able to do this "simply by inventing a 'new' service or equipment classification — to be introduced by the unregulated subsidiary — that just happens to encompass all the important features of an existing regulated offering," Hinchman added.

Afterward, attractive pricing will encourage customer migration from the old regulated service to the new unregulated one, he said, pointing out that the phone company's Telpak and Hi-Lo tariffs represent two of "several occasions" when AT&T has done the same thing in the past.

Through these tactics, "AT&T could transfer its 95% share of the intercity private-line market and over 75% share of the equipment market to its unregulated subsidiary virtually at will, Hinchman charged.

He wants the Bell System broken up into "one or more equipment manufacturing and marketing companies, a long-line or interexchange telecommunications service company, approximately 20 independent local exchange telecommunications service companies comprised of the existing Bell operations.

ing companies, and perhaps an information services company built around the Yellow Pages directory services and advertising operation."

and advertising operation."

These firms "would still dominate their respective markets to a substantial extent and would still be among our largest corporations, but they just might be sufficiently independent from one another to permit effective regulation of any monopolistic tendencies and effective competition from other reasonably sized firms." he said.

other reasonably sized firms," he said.
Divestiture isn't very likely, however, because both Congress and the FCC believe lesser remedies will be adequate, Hinchman said. In addition, "AT&T is working diligently and thus far very effectively" to defeat the divestiture idea.

Barring "successful completion" of the Justice Department's pending antitrust suit against AT&T or a similar change in the political and regulatory climate, Hinchman indicated there will be little to threaten AT&T's present monopoly for the next several years.

Even if the FCC's emphasis on competition works, it will be some years before either the legality or the effectiveness of its approaches are known, he pointed out. During that time, "AT&T will be relatively free to resurrect discredited practices or invent new ones."

The FCC "has already abandoned some hard-won tools for ensuring cost, pricing and performance accountability, and seems likely to further abandon its conventional techniques and responsibilities," he added.

Hinchman said a new schedule of local exchange access charges will undoubtedly be established by the FCC, but it "may well" price the private-line and switched services offerings of the specialized carriers out of the market unless a court intervenes.

French Official Issues Appeal

PARIS — France has called for international cooperation to prevent a Big Brother-type misuse of computerized information, The Wall Street Journal reported recently.

The appeal, issued by French Industry Minister Andre Giraud, also called for international cooperation to avoid world domination by a few highly advanced nations in the field of computer data transmission.

Giraud issued the appeal at the opening of a special conference of the 24-nation Organization for Economic Cooperation and Development (OECD) dealing with tighter cooperation in the field of computerized information transmission, the Journal reported

The Western countries must protect citizens against the invasion of privacy by computerized information that would have "neither brakes nor controls," the *Journal* quoted Giraud.

trols," the *Journal* quoted Giraud.
The OECD includes the U.S., Canada, Japan, the UK, West Germany, France and 18 other industrialized non-Communist nations.

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Network World No Longer Three-Tiered: Panel

By a CW Staff Writer

NEW YORK—Two years ago the data communications network world was a neat threetiered package, suggested Kenneth G. Bosomworth, president of International Resource Development, Inc.

Today, however, AT&T's Advanced Communications Service (ACS), Xerox Corp's Xerox Telecommunications Network (Xten) and Satellite Business Systems (SBS) are a lot different than originally conceived, and new networks are on the horizon, he noted.

In addition to seeing the rapid change in networking concepts, users now have to understand the network architecture of vendors and identify the impact of that architecture on vendor-supplied operating systems, added David C. Russell, SBS manager of voice and data market development.

Bosomworth and Russell, along with other panelists, gave their views on the progress of data communications networks during a wideranging session at the International Management Exposition & Conference (Info 80) held here recently.

Civil War

"Today we are looking at problems approaching civil war within AT&T." Bosomworth emphasized, noting the reasons behind AT&T's withdrawal of its ACS filling.

ACS' "anything to any-

Lower N.Y. Gets Buyer's Guide

SHRUB OAK, N.Y. — A directory reflecting the burgeoning computer industry just north of New York City has been published here.

The pocket-sized book was designed as a buyer's guide to make it easier for computer users to locate nearby vendors of computer-related products and services.

The "Directory of the Computer Industry in Connecticut, Westchester and the N.Y. Mid-Hudson Valley" costs \$10 a copy with a shipping and handling charge of \$1.35 - and sales tax for New York residents. It is available from its publisher, William E. Meyer, Box 444, Shrub Oak, N.Y. 105588.



thing" network concept has vanished, he continued. "Users must look outside Bell to a greater degree than expected," he maintained. For example, the Antelope system seems to be in trouble and key personnel in ACS and the Antelope effort have left AT&T, he claimed.

In addition, the SBS concept has changed radically, he charged, with new options being added to bring the service a wider range of users.

Networks such as Graphnet are poised to compete with the original triumvirate, and Telenet Communications Corp. has announced it will use Xten-type terrestrial digital microwave links and storeand-forward switching, Bosomworth added.

The local network scene has become more bubbly in the past weeks. Even IBM is becoming interested in local distribution. A joint venture between IBM and Millicom, Inc., a company involved with cellular radio, is "100% certain," Bosomworth maintained.

By the mid-1980s there will be six or seven competing local distribution techniques, he forecast.

These methods include cellular radio, cable TV and fiberoptics infrared systems as well as telephone company circuits SRS' Russell noted

Besides assessing the vendor's network architecture and its impact on the installation's operating system, Russell urged users to consider the impact of the network on specific applications. If the changes taking place today are bewildering to users, the next two years may "change the ballgame altogether," Bosomworth con-

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Chuck Anastasi, Manager, Timesharing Services, 3M, St. Paul, Minnesota.

Price/Performance.

"3M is a worldwide company with 47 U.S. operating divisions and subsidiaries.

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"Within 18 months we had installed two DECSYSTEM-2060s and were providing 75 % of our U.S. timesharing requirements. Eventually, we'll have over 90 % of our work done on the in-house computers.

"Our price/performance ratio is outstanding. The in-house service on the DECSYSTEM-2060s costs 30% of what it would cost to do outside. That's a cost savings of 70%, which is even more than we expected."

Versatility.

"The University of D.C. was created in 1976 as a consolidation of three colleges in the area.

"Initially U.D.C. had a batch system, but since it was already overloaded with administrative work, neither the faculty nor the students could get any computer time. We decided to get another system to share the workload and to improve services to the students and the faculty.

"We wanted a distributed system that could be used on all three campuses, and that meant an interactive DECSYSTEM-2060.

"Now we can use our DECSYSTEM-2060 any time day or night because our uptime is

over 98 %. Our applications range from word processing for producing proposals to sophisticated graphics, which we use extensively in our Physics, Chemistry, and Engineering departments. And response time is six times faster than with our batch system."



Dr. Daryao S. Khatri, Associate Professor, Physics Dept., University of the District of Columbia, Washington, D.C.

Structured Solutions Offered

Productivity Problems a Real 'Steal' Experience

By Connie Winkler

CW Staff NEW YORK — The program said the session would cover 'The Bethlehem Steal Experi-

The typo was appropriate because panelists at "Increasing Productivity in the System Development Process," — a recent Information Management Exposition Conference (Info 80) session - said they begged, borrowed and bought aids, particularly applications development generators, to in-

crease systems productivity. Winslow S. Hill, manager of home office information services for Bethlehem Steel Corp., told of his company's success with structured design and related methodologies. He admitted that what Bethlehem finally did was a combination of different vendors' ap-

Robert A. Miller, chief sysems engineer for the Chicago Police Department, told how he uses applications generators and related software packages so extensively that one system was built in two hours. Miller now has detectives and police from the Chicago's gang crimes and narcotics investigation group building their own system with the help of only one DP project manager.

We found we were hung up over making decisions to use the computer or not to use the computer - the computer is not the answer to every prob-lem." Hill said. Bethlehem lem." now does both an external and internal DP analysis.

Once it becomes a DP question, Bethlehem implements structured design techniques drawn from the work of Yourdon and Constantine. "Too often in the past we were laying code before people really knew what direction we were going," Hill said.

Since 1977 Bethlehem has completed three large projects of 18,000 hours each and three medium projects of 7,000 to 10,000 hours, using about 20 employees and eight contract programmers. The next step is to extend structured techniques to all 60 Bethlehem programmers, Hill said.

Feeling of Satisfaction

The benefits of structured design methods have been much less measurable than expected, Hill said. "However with one-to-two-week projects there's a tremendous amount of satisfaction. People experience completion of activities they are working on.

One of the biggest benefits has been the fewer maintenance personnel required on structured programs.

Miller said he ran to the application generator software packages after spending \$5 million building a payroll personnel system for the Chicago Board of Education.

By moving to packages, particularly applications generators - Miller uses User Files On-Line from Oxford Software, Inc. - the company

• Eliminated on-line systems training. Typically employees would leave shortly after the training, Miller complained.

· Saved much time on documentation and maintenance, although Miller said he is not satisfied with the documentation available from the applications generators.

 Saved consultants' fees. For the Police Department payroll system consultant fees were only \$160,000.

• Set up a standard design system because all on-line applications fall into the basic design structure of the genera-

· Cut program debugging

· Established a system prototype methodology.

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"We chose the DECSYSTEM-2060 because of its low cost, Bill Kelleher, Chief, its interactive capabilities and its excellent implementation of APL. We also hoped

Computer Facility, United States Railway Association. Washington, D.C.

that the interactive, user-oriented operating system would improve programmer productivity.

"Our productivity figures are impressive. Now we're able to develop and enhance software during prime time and run complex models overnight that would be too costly to run at service bureaus.

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Manager Must Be Superman, Conferees Told

By Connie Winkler

CW Staff NEW YORK - The manager of information systems in the 1980s has to be Superman - retaining his technology cape, but doffing the technical suit for a business suit and becoming one

of the chief executives of the firm. William R. Synott, senior vice-president at the First National Bank of Boston, has done that and told a standing-room-only crowd at the recent Information Management Exposition & Conference (Info 80) how to switch suits.

Superman has to be pro-active (instead of reactive) and has to soar to become the chief information officer of the company, a role Synott called the new career path for the DP manager.

For the 150 attendees at the "Integra-tion of Office Systems with Data Processing" session, the banker identified techniques and strategies for the DP manager to become super information

Information management is not another word for the same old thing," Synott explained. "It's a departure from the old orientation; the DP manager has to come out of the back office into the business areas.

Information as Resource

Information has to be recognized as a resource of the organization, a re-source that must be recognized and managed, Synott argued. "If knowledge is power, then information is power because knowledge is informa-

TELEX 3274/3276

The job of chief information officer (CIO) - equal in rank to chief executive and chief financial officers - does not exist today. But the CIO will identify, collect and manage information as a resource, set corporate information policy and effect all office and distributed systems. The CIO will bring all information together as a resource, the vice-president said.

The key, Synott said, is integration not just of office systems and DP, but of all information resource from minicomputers to telephones. The key is the integration of planning, people and systems. Synott believed a computer terminal on every desk will be as ubiquitous as the telephone today. "Data processing has to be integrated with

business planning and with the business itself," Synott said.

In this information era DPers will have to change their orientation from a technical one using hardware to a business one using information.

Implementation Strategies

What are the strategies to do this, according to Synott?

Business systems planning must be pro-active, where the DP manager aggressively goes out and learns the business, determines how to apply technology to the business, and gets involved in the business. A reactive DP manager just sits back, feels over-burdened with work and waits for someone to ask him to do something, Synott said.

To do successful business planning, the pro-active manager has to identify the critical success factors of any executive's job and then figure how to get that information, or pick it up where it exists in the organization.

Synott also suggested management by strategies - the determination of by strategies—the determination of strategies to reach the objectives of the organization. "Every corporation is different," Synott said. "It's a matter of asking: What are the needs of this company? What would it take to fill those needs? How can the solutions be put in place?"

Forecasting Rejected

The banker rejected the need for extensive technological forecasting, but at the same time recommended keep-ing top management abreast of technological developments. In banking, for instance, spending \$1 million for 10 new branch offices is not a good business decision when a competitor puts \$2,000 point-of-sale terminals in 100 supermarkets, Synott noted.

The Superman manager must also integrate information and people, specifically with users and senior manage-ment. "Shared management of infor-mation is the key to the future," Syn-

He acknowledged more and more users will want their own processing systems. For users who are reluctant to enter the information era, Synott proposed the Trojan horse technique moving a talented systems person into

Once the project is on, there should be no work without joint systems and user involvement. Synott said he gets the users' most talented person for a new systems project.





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Model 765 Portable Bubble Memory Data Terminal.

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part can be in the customer's hands within 24 hours.

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For Career of Predictor

Capacity Planning Called a Hazardous Business

By Tom Henkel

CW Staff
NEW YORK - Predicting systems needs is a tricky business that can have hazardous effects on the career of the

That was the sentiment expressed at a conference session on systems capacity planning held here at the Information Management Exposition & Conference (Info '80).

Dr. Robert P. Goldberg, vice-president of the Lowell, Mass.-based BGS Systems, Inc., said there are three basic ways to plan ahead.

Benchmarks tend to be accurate, but take a long time to complete - often too long. Simulations also take a long time to develop, cost a lot and are seldom believed. Analytic modeling, which Goldberg said is the best way to attack the capacity planning problem, uses logic and mathematical equations to develop a model of the current system. Variables can be changed to give the DP manager some idea of his systems future needs.

But just plugging variables into a model is not good enough. There are a lot of hidden computer system time wasters that should be evaluated. How much of the CPU is actually being used for processing, for example, is one such area that should be studied, Goldberg said.

Goldberg cited an example of an IBM 3033 processor running Time-Sharing Option (TSO), a batch mode, a transaction processor and a catchall group of "other" things going on inside the processor. Initial studies revealed the 3033 was working at 97% of its capac-

However, further tests revealed only 73% of the processor was being used for processing. The other 25% or so was going for nontask work such as

paging and file swapping.
Goldberg pointed out that TSO takes
up most of the nonprocessing space, followed by the batch operation, the transaction processor and then the "other" category.

Time Consumers

Knowing how computer time is being spent is vital to the manager responsible for developing a computer system and keeping up with the growing de-mand placed on it.

One key to evaluate how the system is being used is to build software that looks at what is going on inside the looks at what is going on inside the CPU. If the user can identify bottle-necks by looking at where system queues are developing, theoretically that manager will have a much easier time finding a solution to the problem, Goldberg said.

Comparing a work-load analysis to a

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sort of shell game, Goldberg said many computer vendors are overselling hardware to solve problems that could be resolved by other methods.

be resolved by other methods.

However, one member of the audience noted that even buying a new CPU may not solve the problem. "The work load seems to grow to fill the space available," he said, noting that the added capacity of a larger CPU is often consumed by a stampeding effect from areas of the firm wanting more service.

BGS Approach

Speaking specifically of BGS' approach to the capacity planning prob-lem, Best/1, Goldberg said the model

takes an integrated approach to capacity modeling. Oriented mainly to large IBM MVS users, Goldberg claims the package identifies the hidden processing costs and helps the manager make educated guesses as to what his hardware needs will be in the future.

A user of Best/1, John T. Pantagcos,

manager of capacity planning and per-formance evaluation for Equitable Life Assurance Society of the U.S., said the package has helped him predict future needs and, consequently, keep his job.

Claiming to have come to his current position by decree rather than choice, Pantagcos said the first rule of being a company's sytems decision maker is to cover your tracks.

Most decisions to expand systems will come from management. And the reason for that decision may be spawned by something as trivial as one of the top brass having to wait two hours for a report - even if the computer system is not at fault. At this time, the systems adviser must be able to come up with an intelligent and ac-curate plan to expand the system.

Several Strategies

There are several ways to tackle the problem. First, the systems adviser must keep accurate records on how much of the system is being used. If, in the example of the delayed report to a (Continued on Page 24)

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Affects All Performance Aspects

Ergonomics Focus Seen Vital to System Design

By Connie Winkler CW Staff

NEW YORK — As more and more users in the 1980s develop strategic planning and control systems, increased emphasis on human factors is needed. What is necessary from the data processing probases

It is all "uncharted waters where the pressure is building," according to consultants at an Information Management Exposition & Conference (Info 80) panel on "Human Factors in Interactive System Design."

fessionals is control and security for those systems' data machine interface, is what academics call it, observed Mike Stadther of the Arthur Andersen consulting group. It is the person in front of the machine who affects all aspects of the system performance, Stadther underlined.

"We must recognize that people operate differently than computers," he said. "We must recognize the importance of the system operating the way the user wants and expects."

Interface Areas

Human interface areas to consider in system design are:

 Eye movement, especially in screen design. It is important to remember that the human eye moves best left to right and top to bottom.

 Data clustering. Humans perceive data in clusters of two to seven items because it is easier to retain.

 Natural languages such as query-by-example. Stadther acknowledged this is a difficult area where much work needs to be done.

DP Planning Has Pitfalls

(Continued from Page 23)
top manager, the computer
system was clearly not at
fault, the adviser could prepare a report pointing out that
a systems upgrade is not
needed.

However, when an upgrade is in order, Pantagcos said there are two basic ways to go about it. First is the scientific method. The adviser can pull together all back data on how the system has developed, add some analytic predictions from BGS' Best/1, for example, and prepare a proposal.

The second method is more mystical. What Pantagcos calls the "priest" method involves basically playing hunches. Hunches can be based on a variety of things from knowledge of the system and the computer market to simple predictions.

Best Method?

Which method is best? Pantagcos says the best method is a combination of the two. He recommends the systems adviser get as much information from management on what it wants in a system.

The more variables that can be given a constant value in a modeling system like Best/1, the more chances of making the right decision.

And when it comes down to making a pitch for a particular upgrade, it is best to let the vendor come in and give an "expert" presentation on how the upgrade will improve the system, Pantagcos said.

 Response time considerations. Human performance is dependent on systems performance so that a user gets bored if the response time is too slow, or inefficiently hurried if it is too fast.

 Simplicity for ease of use. Ergonomics is going to be crucial to systems development, but a possible pitfall is the business-computer interface, particularly the control question, Melvyn E. Bergstein, partner in charge of the technical services organization at Arthur Andersen, said. "Who's going to control the data bases as they become recognized as critical resources? Can we afford uncontrolled data base maintenance even with reasonable security?" Bergstein asked.

Because of ambivalence and inaction over the control question, Bergstein predicted there will be business disasters because of poor data base caretaking. Security and control considerations are what data processing professionals are going to have to bring to systems design.



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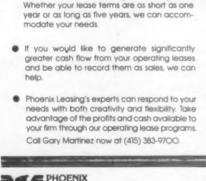


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Univac Eyes Tomorrow's Computer Technology

By Tim Scannell CW Staff

CW Staff
ORLANDO, Fla. — The basic hardware and software structures of today probably will not work well in building the computers of tomorrow, according to Dr. Michael D. Godfrey, a research director at Univac.

In the future — described as being as near as four to five years from now — computers will incorporate high-speed logic and rely heavily on such devices as Josephson Junctions, gallium arsenide circuitry and very large-scale integration (VLSI) technology, Godfrey predicted. And software will become less machine-dependent and more human-oriented, with less of a need for time-consuming, difficult and error-prone testing procedures.

However, getting all the development roads in the right place at the right time on the route toward this technology will be difficult, he observed.

Speaking to nearly 1,000 people here at the recent semiannual meeting of Use, Inc., an organization of Univac 1100 mainframe users, Godfrey gave a brief overview of how Univac sees the future of computer technology.

Like most other vendors in the industry, Univac is basically concerned with squeezing more millions of bits of information per second (Mips) out of future machines and reducing each component's size. However, the firm is also researching ways to ensure that the computer's form follows its basic function, Godfrey claimed. In other words, a computer should perform in a

natural fashion rather that be locked into traditional technological methods. Godfrey claimed that current methods of computing are based primarily on the operating habits of the early Eniac processor. For instance, in a standard computing operation, data

early Eniac processor. For instance, in a standard computing operation, data to be processed is usually taken out of a storage medium and brought to a set of instructions kept in the processor.

This method of operating was fine when instruction sets took up more space than the data, Godfrey stated. However, in today's environment of highly packed data bases it might be a good idea to take the instructions and bring them to the information.

In the same vein, Univac's research director and former instructor at the University of London also foresees the day when centralized systems that sometimes take up an entire room will be replaced with decentralized logic systems — each one applied at a point where the data exists.

Primitive Software

Flanked by more than 40 speakers at the Use meeting, Godfrey observed that tomorrow's user will want a computer system that does not depand on "run-stream and algorithm" software to step through a program. Future systems should operate according to the conditions of the user's data base and not be limited to strict flow-charted procedures.

Current software is even more primitive than hardware, the Univac spokesman said, noting that if com'Use' Meet Well-Attended

ORLANDO, Fla. — Nearly 1,000 people representing 361 Univac 1100 sites around the world jammed into the Hyatt Orlando hotel complex here recently to listen to speeches involving everything from capacity planning to software engineering.

The reason for the get-together was the semiannual Use, Inc. conference, staged by the users group to generate "new ideas, listen to new concepts and learn about new capabilities," Jack Farber, a Univac representative, said.

Åpproximately 200 Univac people attended the four-day affair and delivered 46 of the 110 scheduled presentations. While most of the sessions were technical in nature — with a few closed to the press because of their proprietary nature there were many that focused on general topics such as office automation and program debugging.

The Use meetings give users a chance to confront Univac officials in such areas as maintenance and documentation and express their views. Attendees are encouraged to make suggestions to Univac during the conference.

Thus far, 38 user recommendations have been implemented by Univac since the start of the meetings a few years ago. Approximately 51 other suggestions will also be acted upon in upcoming software releases from the computer manufacturer, a spokesman stated.

puting were compared to the printing industry it would be one step before the advent of movable type.

"We haven't yet achieved what Gutenberg achieved in 1450," Godfrey said.

Software vendors today are "carving software out of blocks" and have not yet produced viable software that can be manipulated and composed into operating units without a great deal of labor. Users should not need to know everything about a computer's operation or a software program before carrying out certain software steps.

Although a great deal of progress has been made, there is still a need for well-designed hierarchical structures, Godfrey pointed out.

In addition, vendors should not be so quick to make their software totally dependent on a particular type of computer. Independence not only enhances the software's importance, but furthers development and fine-tuning by the users and other vendors.

"As long as software is tied to a particular machine, its economic value is in doubt because it is dependent on that machine," Godfrey added.

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Nov. 17-19, Boston — Developing DP Systems for General Ledger and Financial Statement Preparation. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 17-19, Washington, D.C. -Understanding and Using Computer Graphics. Contact: Frost & Sullivan. Inc., 106 Fulton St., New York, N.Y.

10038. Nov. 17-19, San Francisco - Computer Performance Measurement: Tools & Techniques for Increased Systems Productivity. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 17-19, New York - Advanced **Data Communications: Techniques for** Systems Analysis and Design. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 17-19. New York - Minicomputers and Distributed Processing. Contact: The University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 17-19, San Francisco - Fundamentals of Data Processing for the Non-Data Processing Executive. Contact: University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

Nov. 17-19, Washington, D.C. - DP Project Management: A Practical Approach. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 17-20, Boston - Computer-Aided Design & Manufacturing. Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 17-20, Madison, Wis. - Computer Energy Programs for Buildings. Contact: University of Wisconsin-Extension, 432 N. Lake St., Madison, Wis. 53706.

Nov. 17-20, Syracuse, N.Y. - Telecommunications for 1981, sponsored by E.C. Hunter Associates, Inc. and Communications Analysis Corp. Contact: E.C. Hunter Associates, Inc., 132 Atkinson Ave., Syracuse, N.Y. 13207.

Nov. 17-20, Anaheim, Calif. - Autofact West. Contact: Society of Manufacturing Engineers, P.O. Box 930, Dearborn Mich 48128

Nov. 17-21, Denver - Structured Analysis & Design. Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 17-21, New York - Understanding Computers and Controls. Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

Nov. 17-21, Chicago - CICS/VS Application Programming. Contact: On-Line Software International, Inc., 65 Rt. 4 E., River Edge, N.J. 07661.

Nov. 17-21, Washington, D.C. -Structured Programming. Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Nov. 17-21, Chicago - Structured Programming: Design, Coding and

Implementation Techniques. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Nov. 17-21, Short Hills, N.J. - Structured Design and Programming. Contact: Advanced Training Center, Chubb Institute, 480 Morris Ave. Summit, N.I. 07901.

Nov. 18-19, Detroit - SAS Basics Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 18-20, Chicago - Introductory APL Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Nov. 18-20 in Denver.

Nov. 18-20, Raleigh, N.C. - Structured Programming Workshop. Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181. Also being held Nov. 12-14 in Indianapolis and Nov. 3-5 in Arlington, Texas.

Nov. 18-20, Washington, D.C. - DP for Managers & Professionals. Contact: Management Resources Interna-tional, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Nov. 18-20, Chicago - Information Management for Manufacturing Com-panies. Contact: Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Nov. 18-21, Washington, D.C. Computerized Robots. Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa

Monica, Calif. 90405. Nov. 18-21, Las Vegas - National Conference & Exposition for Dealers, Distributors and Reps. Contact: The Interface Group, Inc., 160 Speen St., Framingham, Mass. 01701.

Nov. 18-21, Rio de Janeiro, Brazil -Distributed Processing & Computer Networks. Contact: Long & Associates, Inc., 820 Tioga Ave., Bethlehem, Pa. 18018

Nov. 19, E. Brunswick, N.J. - Small is Beautiful and Other Programming Strategies, sponsored by the Association of Women in Computing. Contact: Grace Shen, Bell Laboratories, Room IK 205, 50 Cragmore Road, S. Plainsfield, N.I. 07080.

Nov. 19-20, Cambridge, Mass. — Strategic Planning for Information Systems. Contact: Harvard Univer-Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Nov. 19-21. San Francisco - Structured Design and Programming. Contact: Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

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Nov. 19-21, Los Angeles - Microprocessor Interfacing, Contact: Suite 1030, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

Nov. 19-21, Washington, D.C. How to Build and Use a Data & Information Resource Directory. Contact: Arnold Barnett, Barnett Data Systems, Inc., 19 Orchard Way N., Rockville, Md. 20854.

Nov. 24-25, Gaithersburg, Md. -Data Communications Host-to-Host Protocol Standards, sponsored by the U.S. Dept. of Defense. Contact: Mr. Fran Nielsen, National Bureau of Standards, Room B-212, Technology Building, Washington, D.C. 20234.

Annual DPMA Meet to Feature 130 Exhibitors

PHILADELPHIA - The annual international conference and business exposition of the Data Processing Management Association (DPMA) will feature educational seminars. workshops, special sessions and 130 exhibitors here Oct. 26-29.

Three preconference workshops to be held next Saturday and Sunday will kick off the meeting. "Distributed Processing," "Avoidance of Computer Crime" and "Data Processing Con-tracts" workshops offer in-depth study into some of the major areas of concern for information processing professionals.

The DDP workshop will include an introduction to DDP and the management considerations for planning it. It will then delve into networking, system hardware and DDP implementation strategies.

The session of avoiding computer crime will propose practical security

methods and discuss deterences, detec-

tion and prosecution.
"Data Processing Contracts" was designed to address all phases of negotiating and contracting for acquisition of computer hardware and software.

The student program on Sunday from 1 p.m. to 5 p.m. was designed for undergraduate and graduate students who are planning careers in DP. It is free of charge for students and focuses on career development.

Five Tracks

The seminar program consists of five tracks, with seven separate sessions in each track: management, personal growth, integrated office systems, trends and directions and assessing technologies

Among the specific subject areas in the various tracks will be "Techniques for Increasing Productivity," "Motivation of DP Personnel," "Personal Obsolescence," "Effective Communications," "Personal Career Planning," "The Office of the Future," "Future Communications Systems," "Impact of the 4300 Technology" and "Software - Right the First Time."

Nido Qubein will give the keynote address at the conference. He claims there are three types of people in the world — the immovable, the movable and those who move.

Those who move are the successful people who apply their utmost creativity, increase their productivity and achieve the highest personal potential.

The total conference registration fee is \$235 for members and \$285 for nonmembers, the DPMA said from 505 Busse Highway, Park Ridge, Ill. 60068

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Six All-Day DP Seminars To Highlight Interface West

LOS ANGELES - Data communications, distributed data processing and small business automation systems will be the focus at the fourth annual

Trade Show Set For Nov. 4-6

SAN JOSE, Calif. – The 1980 Word Processing and Office/Business Processing and Office/Business Equipment Trade Show and Conference, slated for Nov. 4-6 at the Convention Center here, will combine a trade fair of more than 200 exhibits with a five-session symposium.

Speakers at the symposium will cover three umbrella topics: office automation to improve productivity, today's electronic office system and new technology and implementation in phototypesetting.

The keynote speaker at the first session, Dr. James H. Carlisle, president of the New Jersey firm of Office of the Future, Inc., will address the topic of management decisions in the automated office.

The role of management will be discussed at length on day two, which will include a lecture by Edward W. Scott Jr., assistant secretary for Administration at the Department of Transportation, entitled "A Multi-function Office System - A Case Study.

The final session will be hosted by members of the phototypesetting in-dustry who will discuss the commercial uses and types of equipment involved in their field.

Admission to the Conference Center for preregistrants is free, otherwise a \$5 fee will be charged at the door. Registration for the symposium sessions costs \$45 per session, \$80 per day or \$175 for the whole conference. A discount of \$25 per session will be given to additional registrants from the same

company.

Further details can be obtained from Bonnie L. Crystall at the office of the show organizer, Cartilidge and Associates, Inc., Suite 1014, 491 Macara Ave., Sunnyvale, Calif. 94086. Interface West here Oct. 28-30.

Up to 100 vendors are expected to show the wares at the show, which will be highlighted by six all-day seminars tailored for DP and data communications professionals.

The seminars include "A Conceptual Basis and Framework for Office Automation Planning," "Optimizing the Net Control Function," "Inte Voice and Data Networks," "Integrating rks," "Users Strategies for SNA Implementations, Implementing the Large-Scale Word Processing Network" and "A CBX: A Quantum Leap." Enrollment in the all-day seminars will be limited, and there is a \$50 surcharge per seminar tacked on to the regular conference fee of \$95 for three days admission to the regular sessions plus the exhibit floor. Conference and exhibits admission for one day is \$60. Registration for ex-

The show is cosponsored by the Interface Group and Datamation magazine. More information is available from Interface West at 160 Speen St., Framingham, Mass. 01701.

hibits only is \$10.

One-Day Meet Set For Data Flow Update

NEW YORK - A one-day seminar updating the ongoing issue of transorder data flows will take place on Wednesday, Oct. 29, at the Barbizon Plaza Hotel here.

Sponsored by Information Gate-keepers, Inc. and Transnational Data Reporting Service, Inc., the course will include talks by speakers from around the world, including Philippe Lemoine, Ministry of Industry, France; Edmund F.M. Hogrebe, consultant, West Germany; G. Russell Pipe, president of the Transnational Data Reporting Service; and representatives from the U.S. Department of State and various multinational corporations.

The attendance fee is \$225 per person

or, if more than one person from a single organization attends, \$175.

Further information is available from Information Gatekeepers at Suite 111, 167 Corey Road, Brookline, Mass.

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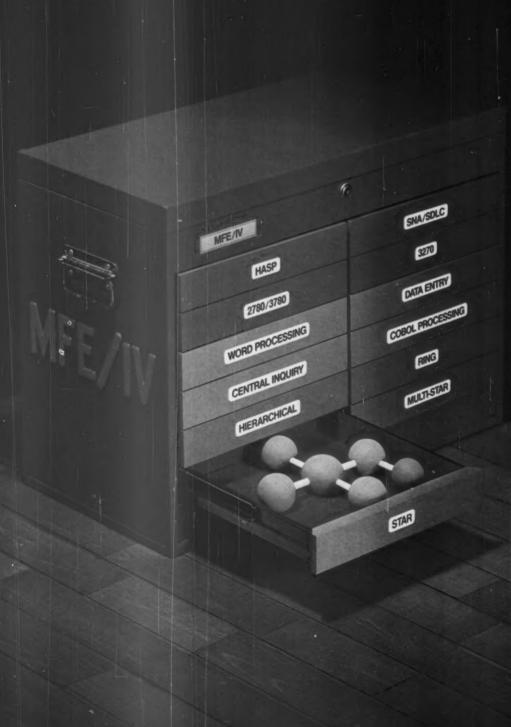
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Wang Institute Opens in January

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TYNGSBORO, Mass. — The Wang Institute of Graduate Studies — the first private, nonprofit, ducational corporation to combine the practical applications of the professional marketplace with the educational standards of the academic environment — will open its doors to students this January.

The first school within the institute will be the School of Information Technology. Its initial program, leading to the degree of Master of Software Engineering, is targeted at relieving the lack of qualified firstline software engineers and architects.

During a recent dedication ceremony, the establishment of the first endowed chair was announced with funds furnished by the Wang family. A gift of \$100,000 from the Warner & Swasey Co., Cleveland, to be used to sponsor a distinguished lecturer series, was also announced.

The institute has been the result of support from numerous area and national businesses, Wang noted. Digital Equipment Corp. and Prime Computer, Inc. as well as Wang Laboratories, Inc. have provided state-of-the-art computer systems so students can become versed in all methodologies and "work in a noncompetitive brotherhood of computer scientists," Wang said.

The institute, incorporated in

The institute, incorporated in April 1979, is not affiliated with Wang Laboratories, Inc.

SOFTWARE PACKAGES

FOR MORE COMPUTERS

Interdepartmental Courses Mesh Computers, Business

By Deborah Wise

BLOOMINGTON, Ind. — To cater to the increased need for business people who understand computers and computer scientists who comprehend business, the University of Indiana has introduced interdepartmental course sequences.

Business majors in the School of Business can take a concentration of courses in computer science in the College of Arts and Sciences and computer science majors can minor in business.

The university has also announced a new bachelor of science degree in computer science which requires a business studies course sequence that includes accounting, marketing and production.

Major Technology

"Computers are one of the world's major technologies, and many computer science graduates will go into business, so it makes sense for those students to learn something about business," Ronald Stephenson, professor of marketing and chairman of the undergraduate program in the School of Business, said.

The computer science concentration for business majors includes programming, data structures and information systems design courses.

The new programs were also designed to help incoming freshmen who are unsure whether to major in business or computer science. As the pre-requisite courses and sequences are similar for the first two years the decision can be put off until the junior year without fear of taking courses that will not be relevant to either major concentration.

In developing the new bachelor of science program, Wise said the department could specify its own language course requirements which had until then limited the number of business courses that could be taken. "We married the two goals [of business and computers] and succeeded in selling the idea to the arts and business colleges."

Honeywell Plans 'Top Secret' Meet

PHOENIX — "Top Secrets '81" is the name of Honeywell, Inc.'s seventh annual computer security and privacy conference, which will be held here April 6-7.

Chaired by Jerome Lobel, Honeywell computer security manager, the symposium will reportedly bring together about 20 national authorities from the field of data security to discuss the business and legal impact of the latest in computer crime and abuse.

Session topics will include computer center disaster recovery programs, state-of-the-art in security systems and investigation techniques.

The conference is \$500 per person, including lunch and program proceedings. Additional information is available from Honeywell Information Systems, Security Symposium Registrar, M/S T-99-4, P.O. Box 6000, Phoenix, Ariz, 85005.

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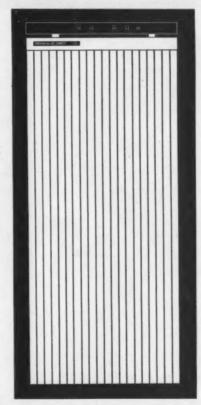
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It takes a lot of money to run the editorial department of a weekly newspaper like COMPUTERWORLD. In a typical issue, we publish well over a hundred articles, already newsnotes, columns, editorials, financial reports, opinions and letters. That comes to well over 400,000 words in a typical four-issue month — about four to five times what you'll find in a large monthly magazine.

Producing this much material — and making it authoritative and useful — requires a large, highly skilled staff. Our editorial department has 20 full-time reporters, editors

and writers in four offices around the country; three regular columnists correspondents around the world; and a complete staff of proofreaders and copy editors. All of these people — and all of the expenses of

offices, phones and travel — are paid for by subscription revenue. You have already bought and paid for the editorial service you want: Objective, authoritative, complete and useful.

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Next time you sit down to send us a subscription fee, think about what your money will be buying. Our editorial people do. They know they're working for you - and that's the way they like it.



Amid High Turnover

What's a Programmer Worth?

I have several years of Cobol experience. I was out of programming for several years in another department, but I came back. Now I see ads for programmers with six to 12 months of experience within a few percentage points of my salary. A year ago my project leader told me I was his highest paid employee; some others in his group had two to three years of experience.

Obviously, I am now looking for better employment. Are there any ordinary presumptions against me, in view of my low salary? How can I counter

Your experience speaks for itself and has a market value which will be recognized by potential employers and probably by your company if they were to hire someone with commensurate skills. There are no presumptions against you.

The compression of salaries caused by the combined effect of inflation and an ongoing seller's market have forced DPers to job-hop in order to increase real income.

For the most part, corporate compensation policies have not been adjusted to accommodate the market value of the DP professional who is currently on the staff. Until corporations recognize the necessity to adjust compensation packages for high demand professions, compression will continue to be a major contributing factor to the very critical turnover problem in DP.

In a recent "Turnaround Time" column you advocated the use of a chargeback system. Our users simply request an allocation of so much money and, with very few exceptions, are granted their request. If users overspend, they are notified and are reallocated enough to cover the overexpenditure.

Our users refer to their computing services allotment as "funny money." Although we try to downplay the term funny money and emphasize the importance of budget control, our users know that overspending has no real effect on their operation or their internal budget and, therefore, pay little attention to our chargeback system.

Have you had any experience with such systems and can they be made to work?

What may be "funny money" to users may very well be real dollars to the data center director who must juggle limited resources to meet the ever-changing needs of users. This method of user accounting is common in your environment (universities), where educational accounts pay with funny money and research accounts pay with real dollars. Research accounts make the existence of a chargeback system necessary.

In order for such systems to be effective in controlling educational accounts, rigorous guidelines must be followed when making the initial allocations to each account. Users should be penalized for loose budget control by charging real dollars for overexpenditures. The user's pocketbook must be affected before this system will

work

Personally, I question the worth of any chargeback system which does not involve the transfer of real dollars, except on a temporary basis. A company in the process of converting to a chargeback system might consider the use of funny money as an interim step. This would provide the user with an idea of the cost of computer services and perhaps soften the effect of having to transfer real dollars to the computer center for services rendered.

Are there standards for the number of pages of documentation which should be developed for

each 10,000 lines of code (page/10,000 LOC) for general business systems applications written in Cobol or Basic? By documentation, I mean the total system documentation, including the operator and user manuals.

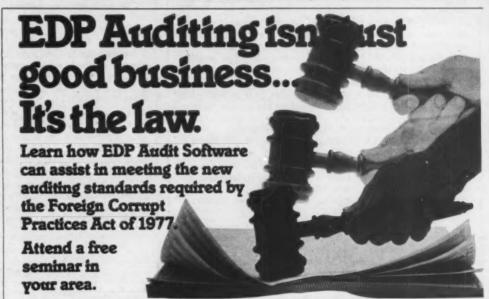
No — nor should such a standard exist. Standards are a necessary ingredient to successful DP operation, but too many standards can impede creativity and productivity. Page/10,000 LOC is a perfect example of a standard that is not only unnecessary but counterproductive.

Too many variables exist in a given system to base the volume of documentation on page/10,000 LOC. SysTurnaround Time By Larry E. Lor

tem complexity, extent of user involvement, on-line or batch, and many other variables would combine to make this standard unmanageable.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.



The accounting standard provisions of the Act require the establishment and maintenance of a system of internal accounting control sufficient to provide "reasonable assurance" that the objectives of internal control spec

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EDITORIAL

Can FCC Curb Ma Bell?

If AT&T is really charging as much as the traffic will bear, as the Ad Hoc Telecommunications Users Committee recently charged [CW, Oct. 13], troubling questions arise about the new communications legislation now gestating on Capitol Hill.

Not only would that legislation — an updating of the Communications Act of 1934 — reduce regulation and thereby make it easier for AT&T to implement schemes like the Installed Base Migration Strategy, it would also legitimize such practices.

Last month, the phone company asked the Federal Communications Commission (FCC) to approve greatly reduced depreciation schedules for its terminal equipment. This change would add \$100 million to the company's 1981 "revenue requirement" — the amount which has to be collected from rate-

payers.

In an accompanying letter, AT&T said the change in depreciation rates was dictated by the commission's new emphasis on competition. Further, AT&T said that during recent meetings with FCC staff, the commission "recognized that terminal equipment lives should be shortened significantly."

All of this suggests that if the pro-competitive legislation introduced in the House and Senate this year is ultimately enacted, Ma Bell will be able to maintain her present monop-

ory.

There is a simple answer to this problem, logically.

It is reflected in FCC chairman Charles Ferris' comments to the House Judiciary Committee last month. Basically, he advised the legislators to delay restructuring AT&T until the Justic Department's antitrust suit is settled and, in the meantime, to allow the phone company to offer terminals and "enhanced" — that is, computer-based — services "subject to safeguards proposed by the FCC."

Walter Hinchman, former chief of the FCC's Common Carrier Bureau, pointed out last month in a speech to the North American Telephone Association (Nata) that "under its present leadership . . . the FCC seems to have lost the will and perhaps the ability to continue . . . the task of holding the car-

tel . . . accountable for predatory practices."

Specifically, he chastised the commission, in its Second Computer Inquiry Decision, for allowing AT&T to offer enhanced services on a deregulated basis "despite the fact that many of AT&T's existing monopoly services and operations may be transferred to the unregulated subsidiary through which such market entry is accomplished."

Ferris, in his House testimony, admitted that the remedy prescribed in the Computer Inquiry decision may not be perfect. His point was that the FCC, if given a congressional mandate,

could make adjustments over time.

Anyone who believes the commission can do what Ferris promised the House Judiciary Committee should look at the history of Wats and Telpak, for starters.

DATA PAST

Five Years Ago Oct. 29, 1975

MINNEAPOLIS — Automation had been a dismal failure in corporate board rooms and in creating public policy, several speakers said at the annual conference of the Association for Computing Machinery here. They said computers had failed as tools in aiding high-level decisions.

Eight Years Ago Oct. 25, 1972

NEW ORLEANS — AT&T said it would introduce an alphanumeric CRT terminal sometime in 1973. The unit, called the Dataspeed 40 service, was undergoing final product trials, AT&T vice-president Theodore Simis announced at the annual Digitronics Users Association meeting here.

Spare the Compliment!

Imitation may, indeed, be the sincerest form of flattery, but when it comes to trademarks, spare the compliment!

Computerworld has been this publication's trademark since 1967. It has been registered in the U.S. Patent Office, and that registration has now become incontestable.

Nevertheless, various retail establishments have begun operating under this name, and CW has been forced to take legal

action to protect its trademark rights.

To date a polite notice of infringement was sufficient to induce a Texas concern to give up using the trademark as its name. However, CW encountered less reasonable people in other instances.

CW brought suit against a concern in Connecticut and achieved a consent decree in accordance with which the defendant changed its name. A similar result was achieved in another civil action brought in New York.

Another suit in California has reached the stage where a set-

tlement has been agreed upon in principle.

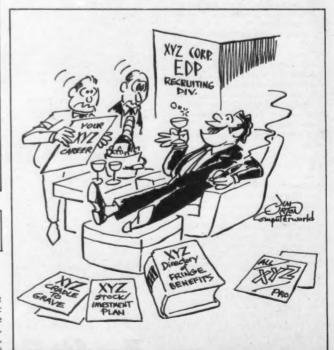
Finally, a suit is pending in Tennessee. Thus far that suit has not been settled and may go to trial.

CW has recently learned of similar infringements in other locations and will take whatever action is necessary to stop the

misuse of its name and trademark.

Computerworld has attained worldwide acceptance and circulation. CW is proud of the name and will take whatever action may be necessary to preserve its reputation and put an end to activities by others that tend to dilute its value.

This is printed not from a desire to be rough and tough, but rather to spread the word so that in the future, those who might plan to use CW's name as their name, whether innocently or not, will be on notice.



'You don't have to sell me, guys — "executive director of personnel" sounds great to start . . . '

HUMAN CONNECTION/Jack Stone

Long-Range Planning: One Formula for Success

"The biggest problem we have in our installation is the inability of our DP management to say 'no' to requests from users. And it's driving us crazy.

"Oh, I know the old story about how we are supposed to come back to management when they try to unload more work on us and tell them 1) we have limited resources, 2) the resources are totally committed and 3) if we take on any new work, some project or other will have to slip. But do you know what they do? They come back and say, 'Times are tough. Do it all anyway.' Our management is absurd—they have no common-sense, long-range plan!"

The DP project leader who made these statements made me wonder if there are any major installations with a decent long-range development plan.

To find some answers, I thought it useful to move beyond DP for a change. I decided to look at how high-technology firms manage their research and development and found one that seems to have a particularly tight grip on it. United Technologies Corp. (UTC), headquartered in Hartford, Conn., spends a vast sum of money on R&D. In 1978, for example, it spent more on R&D as a percentage of sales (7%) than any U.S. industrial firm, including IBM (6%).

I had occasion to chat with some of its managers on the subject and was very impressed with their approach, which they call "bottom-line technology" (a descriptive booklet with this title is available from the company). I

will highlight a few of their philosophies and strategies here (readers are invited to compare them with their own).

First, UTC suggests that people should acquire a better understanding of what technology is before they can expect to manage it successfully. UTC believes the answer depends upon one's point of view. Quoting from the booklet:

"To our thousands of customers worldwide, technology means products of high technical content that can meet specific needs and solve their particular problems...

"To our design engineers, technology is the know-how to create superior products that fill our customers' requirements...

"To our production engineers, technology is the capability to manufacture reliable, cost-effective products that perform as required...

"To our researchers, technology is synonymous with innovation and knowledge-building."

Common Focus

But UTC has found the need to apply good management practices to bring these various perspectives into a common focus, which turns out, ultimately, to be the "bottom line" of the corporate financial statement otherwise known as "profitability."

One such practice is the use of a "matrix diagram" which plots proposed R&D technical programs against cor(Continued on Page 36)

THE TAYLOR REPORT/Alan Taylor

Users May Search in Vain For Expert Witnesses

Users who have been oversold by vendors of hardware and software alike not only have problems in procedure and in finding witnesses, as reported here earlier, but they also have trouble presenting expert evidence.

For instance, I had a phone call last week from a West Coast user of some NCR Corp. hardware and software—the NCR 8200 and Spirit software. His problem was in getting people who were ready to review and report on the way the system was working. He had found it impossible to locate outside witnesses who would stand up to NCR.

This is not a new problem in the courts. Medical malpractice cases for years were held back by doctors' unwillingness to give evidence against other doctors. But the new computer technology has added some significant barriers to the standard social pressures — problems that are national in scope and seem to be particularly present with the smaller companies (including ones the size of NCR).

While this West Coast user has found some Spirit experts, they are apparently not willing to speak. Among the reasons:

• NCR is giving them work.

 NCR is recommending them to the NCR users.

 Acting as a witness is not a particularly pleasant type of work, and there is plenty of other work about for experts who keep up to date.

A perceived threat to continued em-

ployment and continued necessary education can easily produce the same results as if there were an official blacklist. The potential witness quite reasonably feels economically threatened.

Users do not have to fear such problems in every area, though. Software packages, or hardware/software combinations that are demonstrated in their final form, for instance, can be evaluated by experts in the application area without economic problems. It is the general-purpose type of software that needs modification and incorporation with other hardware and software items that is endangered by the lack of available outside experts.

Inadequate Support

There are both short- and long-term effects of users' inability to rely on being able to get experts to speak up. On the one hand, it will and does encourage both overselling before the sale and inadequate support afterwards.

In one recent case involving another vendor, a user's system had simply not been able to get on the air and support was requested. The internal comment leading to a denial of support was simply, "We have spent enough on this account."

In the longer term, this scenario will lead to abandonment of hardware vendors in favor of software vendors at an ever-increasing rate. Software vendors — particularly ones that sell operating systems and compilers for several

(Continued on Page 36)

SOCIOLOGY OF COMPUTING/Robert L. Glass

Hiding One Failure Behind Another

Failure — especially computing failure — comes in a lot of disguises. This is a story that moves from failure to success to . . . well, let's not give away the ending just yet.

As the story opens, the contractual relationship between General MPG and Automotive Automation is strained, at best. The new model Pussycat Purr sports car is ready to roll off the assembly lines, and Automotive Automation's computerized carburetor for the Purr is about as reliable as vapor lock.

General MPG is climbing all over Automotive Automation to try to figure out why. Well, actually, it not only wants to figure out why. It wants the problem fixed, too.

Automotive Automation isn't helping much. Its digital computer hardware people are pointing at the software people. The software applications people are pointing at the software executive people. And the executive people are pointing back at the hardware people. It's a round robin of irresponsponsibility.

To try to get a clearer view, MPG has sent Cliff Keylock to live on-site with the Automation people. Looking over their shoulders, poking around their listings, shuffling through their circuit diagrams, maybe Cliff can figure out

what's wrong. At least, that's the plot. But it's not good enough. Weeks have passed since Cliff changed office buildings, and there's still no carburetor for the Purr. It's time, say the Wheels at MPG, for a full-blown subcontractor audit.

Now there's a term to strike terror into a subcontractor's heart. "Audit" ranks right up there close to "default" and "litigation." Who wants someone else telling you what you did wrong? Certainly not Automotive Automation.

But an audit was scheduled anyway, conducted by the most aggressive MPG manager around, Hob Ratchet, and a team of hand-picked subordinates.

"Move on Automation" is the word from the Wheels to Hob. "Use Cliff Keylock in any way you can, identify the problem and fix it!" The last three words were almost a shout. Wouldn't you be upset if you were the Purr project manager and your announcement date had already slid five weeks?

When Hob first got together behind closed doors with Cliff, he learned a lot. The hardware was shaky, but so was the software. All the fingerpointers were right. The whole project was in trouble, up to its butterfly

valve. Now the question was, where to start?

Strategic Error

At this point, Hob and Cliff made what became a strategic error. The support software used to build the application code — the assembler, the linker, that sort of thing — looked especially bad, said Cliff. It was slow — so slow that the application programmers had been patching like crazy to avoid the time lag and cost of rebuilding from source after a change. And those patches had been a plague of unreliability.

The support stuff should be fixed first, Hob and Cliff decided.

It was when the audit team laid this preliminary conclusion on Automation that the strategic error was exposed. "No, the assembler's no problem," said the application programmers. "Right on," said the executive team. "No problem there," agreed the computer hardware group. It was the first time in the history of the project that the Automation crew had agreed on anything!

Hob and Cliff backed away, quickly. Hob even apologized to the Automation support software lead. "Sorry," he said, sheepishly, "I got some bad information." And he glared at Cliff. It wasn't too long after that the apparent culprit was exposed. The computer, by contractual agreement, had to run at a blazing fast speed. And the problem was, that was too fast. The hardware was running at the ragged edge. Sometimes it was OK, and sometimes nothing worked.

The fix was even easier. The contractual requirement was eased, the computer was slowed down and everything else began playing together much more reliably. Even the fingerpointing, for the most part, came to a halt. There were still problems, but the Purr came out only a couple of months off schedule.

Happy ending, right? Failure converted into success?

Well, sure. Cliff still wondered, though, how he could have been so wrong about the support software.

It wasn't until a couple of months later that Cliff heard what had really happened. Yes, the contractual/hardware change had solved a lot of the problem. But so had the new, faster assembler that Automation had secretly put into use about the same time!

Why the secrecy? Why the lie? Because it was politically smarter, Cliff began to realize, for Automation to pin the problem on the contract than on

(Continued on Page 36)

Firm Succeeds at Long-Range Technical Planning

(Continued from Page 35)

porate business objectives, long-range strategies and operating plans. This diagram helps provide a broadened perspective to technical planners and corporate managers who work together to forecast payoffs from R&D spending. These people are asked to find out which projects lead to maximum utilization of resources and minimum risk of failure. They ask such questions as (from the brochure):

'Do planned R&D projects support corporate strategy?

Are those company activities that need technical support receiving it?
"Are important R&D projects being postponed or overlooked?"

Another management practice is the use of a financial planning and control

system which is based on "return on assets" (ROA). ROA is the ratio of financial return to corporate assets: profits/assets. ROA is also the product of two other ratios: profits/sales (return on sales) and sales/assets (asset turnover). In other words, ROA reflects both profitability and the efficiency of asset utilization.

Usable, Understandable

One of this system's advantages is that it is usable and understandable by nonfinancial managers and does not depend on complex accounting proce-

Another is that only a relatively small number of financial parameters need be monitored by top management. And the monitoring is accomplished in a simple but highly effective manner. A table called the "ball chart" is prepared to plot variances from plan for 10 financial indicators on the horizontal and name of operating division on the vertical. An empty box signifies acceptable variances; unfavorable variances are indicated by circles.

The UTC approach to technology management is far more comprehensive than I have described in this limited space. But I wanted to write about it anyway to encourage DP managers to believe that there are some firms that are dealing successfully with long-range technology planning.

One Failure Hides Another

(Continued from Page 35) the software. After all, MPG had participated in writing the contract. It could be argued by Automation that it was partly MPG's fault, if it ever came to that

It didn't. MPG was just glad to get the Purrs rolling off the assembly line.

No one wanted to rock that boat. But back to the theme of this story. Failure, you remember, comes in a lot of disguises. In this story, one failure was deliberately disguised — by hiding it behind another!

Search Might Be for Naught

(Continued from Page 35) manufacturers' computers - have to see that their systems are in operation as described. Equally, the secondary software developers who themselves rely on the transportable operating systems will no longer have to rely on single-sourced (and therefore compro-

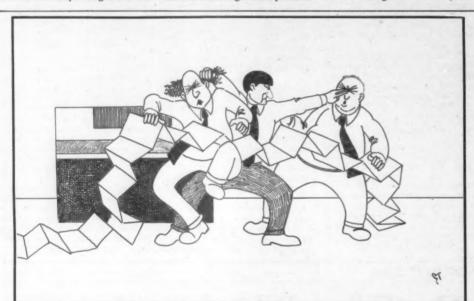
mised) hardware supplies.
For most users, however, this scenario is in the future. For the present, users trying to drive a good bargain with combination hardware/software suppliers should remember that no contract is stronger than the ability of the user to enforce its terms, economically. And that may require locating experts who are willing to talk

Meanwhile, for the West Coast reader, if you know of a potential NCR 8200 expert who, preferably, knows Spirit, please contact him through me at *Computerworld*. Thanks for your help.



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Difficult Situation

I must say I was sorry to read the article in the Aug. 18 issue regarding Digital Equipment Corp. revenues. The article failed to mention the nu-

The article failed to mention the numerous price increases placed upon both OEMs and users during the past few months. As a broker, I find this makes things very difficult when I quote prices to an end user, only to find two or three weeks later DEC has announced another price increase.

It was my understanding several months ago that DEC was not expanding production facilities. Now, the article said DEC is in the process of further expansion, and I find it difficult to believe the \$209.8 million figure that was said to have been spent on equipment and so forth.

Early this year, I ordered a large number of processors and was given a delivery date more than 20 months away. This lead time was out of the question to my client, and I was forced to purchase the equipment from dealers in other parts of the country. I have all but discontinued handling

I have all but discontinued handling DEC equipment in favor of IBM General Systems Division computers, since the equipment can be readily found, and end users are more familiar with IBM. Also, IBM has been much more cooperative in supplying my company with information, supplies and parts with virtually no delay.

Three cheers for IBM!!!

Donald J. Sanderson Jr. President

Adtec Systems, Inc. Tampa, Fla.

Helpful Directory

I appreciate Larry Long's admonition to look for consultants among those who have authored books and articles [CW, Aug. 25]. But there is another source of consultants: The Computer Consultant Directory, advertised in Computerworld, which may be ordered from Battery Lane Publications, P.O. Box 30215, Bethesda, Md. 20014.

I've been happy with the directory; it helps me to keep an eye on the competition and there seem to be three to four listings in almost every conceivable speciality. (Now if I can just persuade the directory to publish my articles, I'll be a consultant's consultant.)

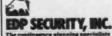
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LETTERS

Developed by Microsoft

In reading Computerworld Extra [Sept. 17], we were very pleased to see Herbert Gepner's citing of the Softcard peripheral for the Apple II computer as an approach to solving the software portability problem that exists between different kinds of microcomputer systems. We were less enthused, though, by this attribution of this product to Apple Computer, Inc., and we'd like to set the record straight.

The Microsoft Softcard was developed and is sold by Microsoft Consumer Products of Bellevue, Wash. In addition, the Softcard does not just emulate a Z80 environment, it actually is a Z80 environment. The circuit card

contains a Z80 processor and is supplied with both Digital Research, Inc.'s CP/M operating system and Microsoft's Basic interpreter in a package that retails for \$349. And while the Softcard allows Apple owners to utilize the Z80, it in no way hampers normal operation of the Apple in 6502 mode.

Interestingly, the idea for the Softcard arose from our own software portability problem. Since Microsoft has invested years of effort in developing a complete line of system software products for Z80/8080-based microcomputers, we were anxious to market those products to the ever-growing Apple computer base. But rewriting the packages for the 6502 processor would have entailed practically reinventing the wheel and we knew there had to be a better way.

It was one of the founders of Microsoft, Paul Allen, who hit upon the idea of putting a Z80 processor into the Apple. The product has been on the market several months now, and response has been excellent not only from Apple owners but also from developers of Z80 software who can now sell their products to Apple owners.

We feel it is this kind of innovative approach to software problem-solving that will enable us to realize Gepner's very complimentary projection that Microsoft will be among the "few leading mini/micro software houses [that] will clearly rise above all the rest" within a few years.

Vern Raburn President

Microsoft Consumer Products Bellevue, Wash.

For every reason you have to choose CICS, there's an even better reason not to.

Not long ago, everyone had a very good reason for electing to use IBM's CICS TP Monitor. There simply wasn't a good alternative. But since the advent of SHADOW in 1973 and ultimately SHADOW II in 1975, there's every reason to reconsider. Look for example at the reason many people cite for choosing CICS... compatibility with IBM hardware. A good reason, indeed, but in truth...

SHADOW II is even more compatible. And well it should be. INSAC Software's business is, after all, exclusively software. So all our energies are put toward developing, improving and enhancing systems software to make the best use of IBM hardware. In short, in this area, we can out IBM IBM.

For those who reason that it's simply easier to buy and install a TP Monitor from the same people you buy the hardware, we'd like to point out this.

SHADOW II's technical consultants know IBM hardware as well as IBM technical consultants. And because SHADOW II is such an advanced TP Monitor, it can typically be installed in less than one hour. Compare that to the time it takes to install CICS.

And while there seems to be a great deal of wisdom in reasoning that technical support and maintenance will be better for CICS by virtue of its being an IBM product, consider the reality of the matter.

SHADOW II has, in the first place, far lower technical support requirements than CICS. But when such support or maintenance is required, an

SHADOW II



ample and highly capable support team stands ready on a moment's notice to provide necessary service. In fact, present users and objective evaluators alike cite this area as one of SHADOW's greatest strengths. In addition, our technicians provide four days of intensive, on-site, classroom education in using the SHADOW package.

Finally, for those who reason that despite the problems which CICS has become notorious for, it is still a risk to buy a TP Monitor from a company other than IBM, we would like to summarize by saying this:

SHADOW II has long continued to outperform CICS on virtually every important criteria. And while IBM has made attempts at correcting problems, CICS performance stills falls dramatically short of SHADOW II in memory usage, CPU utilization, response time, application development time and programmer training time. In short, no matter how IBM has added to, taken away, or otherwise repackaged their system...It's still CICS. And therein lies the problem.

So If we haven't already given you reason enough to consider SHADOW II for your TP Monitor, we welcome the opportunity to give you more. And it just doesn't seem reasonable not to let us.

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I want to learn more about SHADOW II

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We're a Fortune 500 company and a leading supplier of data communications terminals. Sales offices are located in Atlanta, Boston, Chicago, Los Angeles, New York, San Francisco, and throughout Europe. Or contact one of our authorized distributors: Arrow Electronics, Inc. • Computer Peripheral Technology, Inc. • Computer Peripherals of New England, Inc. • Data Terminal Mart • The David Jamison Carlyle Corp. • Digital American Computers, Inc.

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For more information on the 1251 write: Perkin-Elmer, Terminals Division, Flanders, NJ 07836. Or call toll free: (800) 631-2154. In NJ (201) 584-1400.

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PERKIN-ELMER

Random Notes

'Key/Master' Supports FBA, Offers Enhanced Statistics

NORWALK, Conn. - Turnkey Systems, Inc. has announced support for IBM fixed block architecture (FBA) devices as one component of a new release of Key/Master, the firm's on-line data entry package for CICS.

Resease 2.2 of Key/Master is said to support FBA devices through Turnkey Systems' Bdam/E access method. Bdam/E will allow the program to run on the IBM 4300 series with 3310 and 3370 disk devices without using IBM emulators or Vsam, the vendor claimed.

The release also offers users an enhanced statistics package designed to increase user productivity, one component of which consists of an on-line display allowing supervi-sors to monitor key files maintained by Key/Master.

Key/Master costs \$18,000 for the DOS version and \$20,000 for the OS version. Lease plans are also available. Turnkey Systems is located at 50 Washington St., Norwalk, Conn. 06854.

Sorting and Report Generation Added to 'CA-Sort' Package

JERICHO, N.Y. - Computer Associates, Inc. has announced two new features for its CA-Sort package that allow multiple concurrent sorting and report generation.

The multiple concurrent sorting feature now standard with the package and free of charge with the release of Version 6.1 - reportedly allows up to nine different sorts as output from one pass of the input data set.

The second feature, the optional CA-Dart, allows the generation of reports from the output stage of the standard sort utility.

CA-Dart, which requires 18K bytes of storage, may also be used with an IBMcompatible sort, according to the firm. The CA-Dart option costs \$2,000 for a CA-Sort user and \$4,000 for a nonuser. The firm is located at 125 Jericho Tnpk., Jericho, N.Y.

Package Links DG Systems For Direct Communications

BATON ROUGE, La. - A package that links any two Data General Corp. Nova, Eclipse or Micronova CPUs for direct communications is available from Data Systems of Baton Rouge, Inc.

Blast runs under DG's RDOS and DOS operating systems and can simultaneously transmit and receive data files, programs and commands.

Blast costs \$1,100 for the first copy and \$110 for each additional copy, the vendor said from 8939 Jefferson Highway, Baton Rouge, La. 70809.

PREVENT "Wild Cards"

IN YOUR DATA

HP 3000 Relational DBMS **Touts One-Day Training**

MOUNTAIN VIEW, Calif. - A relational data base management system (DBMS) designed for Hewlett-Packard Co. 3000 series computers has been introduced by Computer Resources, Inc. (CRI). The Relate/3000 DBMS provides a data structure that can be visualized as two-dimensional tables rather than a highly structured format that can require extensive programming and technical training, according to a CRI spokesman.

This allows the nontechnical user to manipulate the information contained in the data base via a set of tools that includes an interactive language, a set of interface routines and a comprehensive message subsys-

tem, he explained. While conceding that "nonrelational data systems may work well within large companies that can afford the high training costs, he indicated that Relate/3000 was targeted toward the companies that could not afford these costs and had not purchased a DBMS The training time for Relate/3000 is claimed to be approximately one day and the elimination of the high training price tag leads to a good return in costs efficiency and labor savings, he said.

This labor cost savings is illustrated in the time requirement for writing, testing and maintaining application programs, he continued. CRI claimed that an 80% cost reduction for writing and testing Relate/3000 application programs is possible when compared to the same program being written in Cobol or Fortran.

These levels begin with a clerically oriented data entry task and end with the complete

class of operation research problems that involves complex relations between various mathematical entities and CRI also predicted that the provision for converting the message system into non-English languages would make Relate/3000 suitable for multinational organizations.

Relate/3000 is available immediately for a \$10,000 licensing fee from CRI at 2570 El Camino Real Mountain View Calif. 94040

File Management

Page 39

SOFTWARE

Primarily designed for file management environments, the DBMS is at least initially targeted at the end user who is involved in business or engineering applications. Potential applications can run through all organizational levels, and diversification is provided for via a three-part user manual that corresponds to three different levels of interaction, the vendor spokesman said.

language description that would be required by an installation's programming staff. The system can, however, be used for that

Runs in Native Mode

System 2000 Adapted for VSE

AUSTIN, Texas - Intel Corp. introduced System 2000/VSE, a version of its data base management system (DBMS) for IBM 4300

DOS/VSE Release 2.90 reportedly was designed to function as a native mode DOS/-VSE product and to utilize both IBM's microcoded Extended Control Program Support (ECPS) facility and fixed block architecture (FBA). Complete Vsam support is integrated into the DBMS, which is available for 4300 series hardware operating under DOS/VSE or VM DOS/VSE, Intel said.

Specifically designed to respond to production application requirements, System 2000/VSE allows programmers and end users to address application backlogs through the development of application solutions, Intel claimed.

Licensing for the basic System 2000/VSE software starts at \$45,000, Intel said from 12675 Research Blvd., Austin, Texas 78766.

pdated 'Inquire,

FALLS CHURCH, Va. - Infodata Systems Inc. has announced Release 11 Version 1 of its Inquire data base management system (DBMS) and Release 1 Version 1 of IQ/Net, an advanced management system for the

information and DBMS capabilities in the VM/CMS environment, performance improvements said to reduce I/O by 60% to 70% and "the next step toward full networking capabilities," according to the vendor.

The networking feature, known as the Communications Task, appears in versions of the Data Management Supervisor multithreaded central copy — of Inquire and IQ/Net, operating in a CMS environment, a spokesman explained.

All new releases are free to subscribers of the Infodata field service. Inquire costs \$70,000 to \$150,000 and IQ/Net prices range from \$50,000 to \$85,000. Infodata is located at 5205 Leesburg Pike, Falls Church, Va. 22041.

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Unix, SCCS Supported by PE 32-Bit Supermini

REDWOOD CITY, Calif. - A soft-ware product that combines the latest version of Bell's Unix operating system with its associated Source Code Control System (SCCS) is now said to be supported on Perkin-Elmer Corp.'s line of 32-bit superminicomputers.

The product, known as Edition VII Workbench, marks the first time Bell Laboratories' SCCS has been available with Version 7 of the Unix operating system, according to a spokesman for the Wollongong Group, the the Wollongong Group, the Workbench's developer and supplier.

SCCS is a software development and management facility that provides audit trails for program modules and allows programmers to record changes to source files, documentation and data. With the facility, users can recreate previous versions of a program or manage different versions of the same

program at the same time. SCCS was already available with Version 6 of the Unix operating system. But the program development and management tool had never before been offered with the operating system's latest release until the Wollongong Group added the facility to a Version 7 Unix operating system the company bought from the University

of Wollongong in Australia. The Wollongong Group, formed last June, has begun supporting its com-bined SCCS-Unix Version 7 product on Perkin-Elmer's Models 7/32, 8/32, 3220 and 3240 superminis, all of which are 32-bit machines. The Wollongong Group will also support its product on all membes of Digital Equipment Corp.'s PDP-11 minicomputer line, especially the PDP-11/70, the company spokesman said.

'Tolstar' System Aimed at Firms Doing Shareowner Recordkeeping

CHERRY HILL. N.I. American Accounting Software, Inc. has released Tolstar, an on-line stock transfer and recordkeeping system designed for major corporations doing their own shareowner recordkeeping, as well as bank trust departments.

The system features full on-line data capture and edit and account lookup utilizing an automatic account assignment technique, the vendor claimed. adding the on-line entry employs a conversational mode with effective operator prompting and control.

Optional features available include dividend reinvestment, correspondence control, tender offer exchange and transfer.

The system is operational on IBMcompatible hardware under MVS and utilizes CICS for data communications and Vsam or Cincom Systems, Inc.'s Total for file management, a spokesman said

The basic Tolstar costs \$125,000. The dividend reinvestment option licenses for \$15,000: the transfer module. \$10,000; the correspondence control module, \$5,000; and the tender offer exchange module \$10,000, the vendor said from Suite 13, 1864 E. Marlton Pike, Cherry Hill, N.J. 08003.

System Support

For both the DEC and Perkin-Elmer hardware families, the Wollongong Group's support will include installa tion of the Unix operating system and its accompanying SCCS as well as documentation and ongoing software maintenance. Support will also include a weeklong user-training session during installation and additional instruc-

tion after the installation is complete, the source said.

Although the Wollongong Group claims to be the only form to offer Unix Version 7 with SCCS, other forms of the widely used operating system are already said to be supported by several other companies. The main reason such suppliers have arisen is that Unix's developer, Bell Laboratories, is prohibited from supporting the operating system itself.

The Wollongong Group chose to focus its initial support efforts on Perkin-Elmer's machines partly because they are said to outperform other processors in the same product class and because they reportedly constitute the largest share of the 32-bit supermini market, the spokesman said

A single-user version of the company's Edition VII Workbench costs \$12,000, with additional users supported on a per-port basis. The price covers all support items, including binary license, system generation and 90 days of software support.

An optional one-year support contract costs \$450/mo. Support for Unix Version 7 with SCCS is available immediately from the Wollongong Group at 652 Bear Island Road, Redwood City, Calif. 94062.



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15 Computer Performance Measurement: Tools and Techniques for Increased System Productivity	Sept. 15-17	Nov. 17-19	Oct. 27-29	Dec. 15-17			
16 Introduction to Word Processing: Concepts, Systems and Applications	Oct. 29-31	Oct. 1-3	Oct. 20-22	Sept. 15-17 Dec. 15-17			12-14 even
17 Word Processing: Effective Operations Management	Nov. 10-12	Nov. 19-21	Oct. 29-31	Sept. 29-Oct. 1 Dec. 8-10			15-17 ISTON
18 Integration of Word Processing and EDP Systems	Oct. 15-17	Nov. 12-14	Oct. 1-3	Nov. 19-21		Oct.	29-31
19 Automating Your Office Today: Planning and Implementation Methods	Sept. 29- Oct. 1	Oct. 6-8	Nov. 5-7	Dec. 8-10	Nov. 17-19		
20 Electronic Mail: An Overview of Concepts. Systems and Applications	Sept. 22-24	Oct. 22-24	Oct. 15-17	Dec. 15-17			
21 NEW - Introduction to Micro Personal Computers: Application, Selection & Usage Guidelines	Nov. 12-14	Dec. 15-17	Sept. 29- Oct. 1	Oct. 8-10	Oct. 20-22		



48-PAGE CATALOG

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Now, unleash the true power of your 4300-type processor.

When you chose a new 4300-type processor, it was to upgrade system performance and reduce ownership costs. Yet, if you select the wrong tape subsystem — a subsystem whose performance is not "balanced" with that of your processor — you can actually strangle throughput and reduce system efficiency. On the other hand, if you choose STC's new 4500 tape subsystem, you can achieve a balanced system, and get all the throughput and CPU utilization for which you've paid.

The new STC 4500 is fully compatible with today's intermediate-sized processors, including IBM 360, 370 and 4300 series Including 18M 360, 370 and 4300 series devices, as well as other comparable units. But more importantly, the STC 4800 incorporates speeds of 75 and 125 (ps., and densities of 800 bpi (NRZI), 1600 bpi (PE) and 6250 bpi (QCR). This combination of high-speed and high-density permits the 4500 subsystem to deliver performance equal to that of your CPU, to help achieve a halanced system.

equal to that of your CPU, to help achieve a balanced system.

For example, if you compare an STC 4500 with today's screaming tape devices, there's no comparison at all. In data mode, a streaming tape will typically transfer data at a rate of about 20 kb per second, while the STC 4500 offers a data rate of 468 or 780 kb per second. When you use the STC 4500 to backup a high-

performance disk, it outperforms 8808-type devices (see chart below) by a factor of six to one. If you consider total time, this expends to a differential of eight to one, and with 3410 subsystems, the difference is almost nine to one. In sum, the STC 4800 maless frequent disk backup a realistic and cost-efficient elternative — no matter your worldoad — and at your converience. Equally important, the 4800 subsystem also offers enhanced read/write reliability. Users who move from non-STC 1600 bpi (PE) to STC 6250 bpi drives and who take advantage of GCR blocking can reasonably expect an increase in megabytes processed per soft failure of 30 to 35 times that of PE, and an increase in gigsbytes processed per hard failure of 18 to 20 times. Reduced ownership coets.

Older, 3420-type tape subsystems deliver good performance in certain applications. But their price/performance ratio falls far short of that which you'd expect with a 4300-based system. In comparison, the STC 4500 — like a 4300 processor — was designed for use in any office environment. As you can see from the accompanying chart, this means a reduction

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The new STC 4500 also gives you severa noortant features you'll find on no other omparable subsystem.

comparable subsystem.
For one thing, the 4500 is a tri-density subsystem. Thus, it eliminates the need for a separate, additional 800 bpi drive. This helps reduce your initial investment, as well as your total cost-of-ownership.
STC's new 4500 tape subsystem can be diagnosed either on-site or remotely. In either event, if one 4500 drive goes down, it can be diagnosed in-line, and

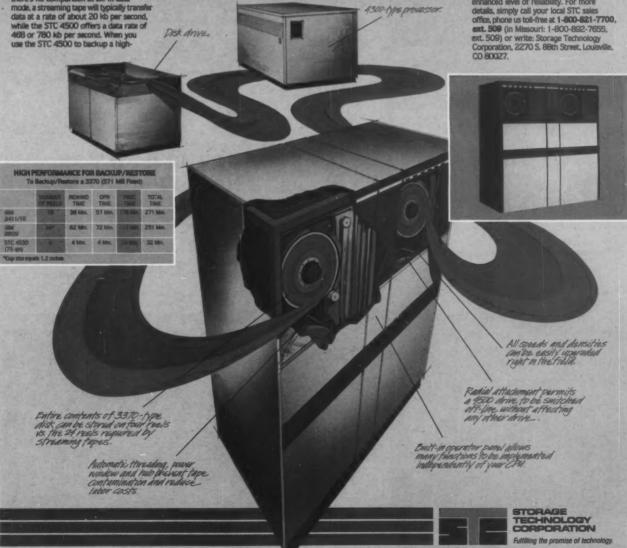
serviced off-line without affecting the re-mainder of the subsystem's operations. Powerful, built-in diagnostics also help Powerful, built-in diagnostics also help assure enhanced data availability. In fact, the STC 4500 has microprocessor-based diagnostics designed to make fault isolation faster and more effective by permitting the subsystem to be exercised in-line. And special "wake-up" diagnostics will exercise the memory, microprocessor, and interface at power-up to assure proper

Proven STC technology.

The STC 4500 was designed around technology that has been tested and proved in some of America's largest, and most demanding, data processing shops. In fact, STC is far and away the world's largest raid, 510 is far and away the world 5 is generally supplier of high-performance tage subsystems for the big processor market. And in the 4500 tape subsystem, we've made all this experience and expertise available to the intermediate system user.

Call now.

Find out for yourself how an STC 4500 tape subsystem can help you achieve a balanced system, reduced cost-of-ownership, new configuration flexibilities and an enhanced level of reliability. For more ext. 509) or write: Storage Technology Corporation, 2270 S. 88th Street, Louisville,



Development Software Tool Runs On PDP-11/34 and 11/70 Minis

Research Corp.'s Program Products Group has announced a release of its Central Software development tool that will run on Digital Equipment Corp. PDP-11/34 and 11/70 minicomputers.

Originally designed to run in the IBM CICS environment to ease programming tasks and throughput, Central Software is said to reduce development time and costs for on-line interactive systems by up to 90%.

Central Software reportedly

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McLEAN, Va. - Planning includes up to eight levels of security controls, screen formatting, automatic edits, a data base manager and programmer and user aids such as on-line application program-ming debugging, diagnostic aids and message switching.

For users in a mixed hardware environment, applications software operating with Central Software under IBM/-CICS is said to be directly transferable to the DEC system, and vice versa.

Available free on a 30-day trial basis, including installa-

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tion, training and technical assistance, the PDP-11/34 version sells for \$14,300 and \$122/mo for maintenance after the first year, or \$518/mo on a three-year lease, including maintenance.

PDP-11/70 costs \$21,200 and \$186/mo maintenance after 12 months, or \$755/mo on a three-year lease including maintenance from the firm at 1764 Old Meadow Lane, McLean, Va. 22102.

Tool Fits VAX, PDP-11

BEDFORD, Mass. - Clyde Digital Systems, Inc. is offering a package for the Digital Equipment Corp. VAX-11/780 and PDP-11 that provides financial management functions and offers process ordering in distribution operations.

The package uses selfprompting commands that allow quick access to the package data base, the vendor said.

Clyde's package costs be-tween \$15,000 and \$45,000, the vendor said from 6 DeAngelo Drive, Bedford, Mass. 01730.

U.S. Companies Offered Tool To Fight Inflation

ANN ARBOR, Mich. Large U.S. companies facing complex inflation accounting disclosures as required by the Financial Accounting Standards Board Statement 33 now have access to an enhanced version of Comshare, Inc's. VSCOM-33.

VSCOM-33 allows users to inform both shareholders and investors of the effects inflation has had on the financial information contained in annual reports. The enhanced features include:

 A data entry validation routine that will screen component input for errors.

· A maintenance system that allows users to alter their data base structure on their own.

· A processing capability enables users to compute current costs and/or constant dollar one record at a time.

· A series of additional internal reports and an audit trail system that allows users to

The cost for VSCOM-33 would vary with each system but would typically run between \$10,000 to \$15,000 for the first year of use and be reduced in price thereafter. The vendor is located at 3001 S. State St., Ann Arbor, Mich. 48106.

HP Micro Runs 'Image'

PALO ALTO, Calif. — Hewlett-Packard Co.'s Image data base management system (DBMS) has been extended to the HP 1000 L-Series microcomputer.

The new version of Image/1000 software, HP 92073A, when used with the RTE-L real-time executive operating system, has a maximum data base size of 200M bytes.

The HP Image/1000 92073A costs \$2,500 with the right to duplicate for use on another computer available for \$1,000. HP is at 1501 Page Mill Road, Palo Alto, Calif.

NCR Gives CIF Users **NOW Account Processing**

DAYTON, Ohio - Software that allows commercial banks using NCR Corp. central information file (CIF) systems to implement negotiable orders of withdrawal (NOW) account processing, without having to convert existing CIF files or expand current hardware configurations, is available from NCR.

As a result of recently enacted legislation, NOW accounts, which accrue and pay interest on demand deposit funds, can be offered by all U.S. financial institutions beginning next year.

The software calculates NOW and demand deposit account interest based upon a rate specified by each bank, using current balance or cur-

rent balance minus float.

Either straight daily accrual or daily interest compounding methods can be employed, and a supplemental rate may be applied to particular accounts to increase the total interest rate, the vendor claimed.

The interest crediting cycle may be independent of account's statement cycle or synchronized with it. Users options include minimum amount of interest to be earned paying or forfeiting accrued interest when an account is closed.

The one-time license fee for the software ranges between \$3,000 and \$10,000, depending on the number of accounts, the vendor said from Dayton, Ohio 45479.





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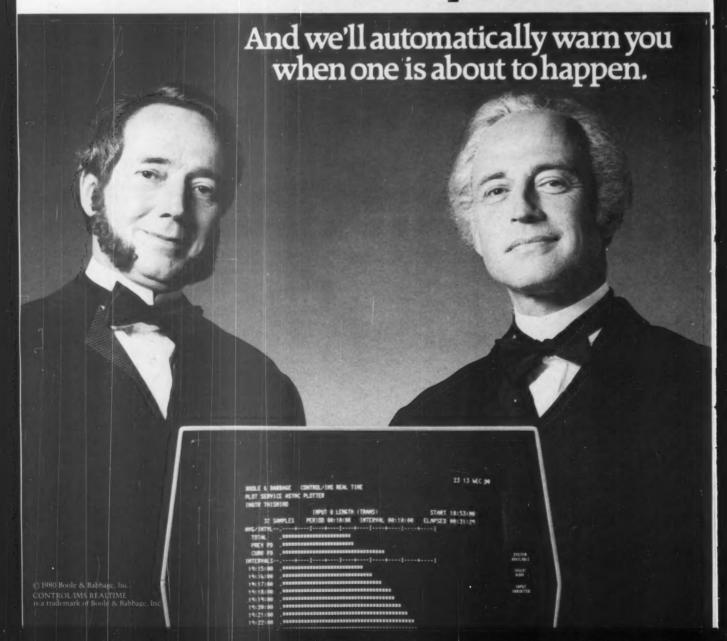
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'Conman' Console Manager Gets Enhancement Package

MISSION VIEJO, Calif. - A package of enhancements and new features has been added to the Conman console manager from Jason Data Services.

Conman provides users of IBM's DOS and DOS/MVT, DOS/VS and VSE and Nixdorf Computer Software Co.'s Extended DOS (Edos) with a console spooler. It supports all directaccess storage devices; 1052, 3215, 125D 3270-type CRT terminals up to 48 lines: 370/138, 148, 158 and 158 system consoles; 30 series system consoles; and 4331 and 4341 systems con-

With the new additions, if the CRT terminals become inoperable, the user may now continue operation with only his 1052 or 3215 until the terminals are back on-line, the firm said. Conman now requires no changes in either the user's operating system or applications programs. Multiple responses for each

partition may be preanswered, and complete message routing is now included based on any text in the message and coded in boolean algebraic

Conman has special spooler forms mount interfaces for Power, ESF and Sage as well as a VM interface. Now 36 PF keys are supported instead of 24 and main storage requirements will average 26K- to 30K bytes instead of 20K- to 30K bytes, the vendor noted.

The file dump program may now be run in any partition at any time and Conman uses no transients except at start-up time and EOJ time if SysIst must be opened, the firm said.

Several enhancements have also been added to the console manager, which has a monthly rental charge of \$200 per month and a perpetual license of \$6,500 with \$600 annual maintenance from the vendor at 24871 Pylos Way, Mission Vieio, Calif. 92691.

Memorex Offers Utility Geared to MVS Shops

SANTA CLARA, Calif. - Memorex Corp. is offering MRXPrint, a utility software package for the IBM MVS environment that reportedly allows users to reduce printing work load at the central computing site while also improving output turnaround at remote I/O locations.

The package allows computer output printing on IBM 3284, 3286, 3288, Memorex 2089 and equivalent printers at local or remote sites. Output can be queued from TSO terminals, JES2 and user-written programs.

The product costs \$7,500.

Memorex also announced that MRX-DASM, a utility that provides backup, recovery and space management func tions for high-capacity disk drives, is now available on a 30-day no-charge plan. It then costs \$6,500 before Dec. 1 and \$8,500 after that date, the vendor said from San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Software Guidelines Out

RYE, N.Y. - Improving DP Software Associates, Inc. report that provides guidelines for effective project management and quality control in developing, installing and maintaining computer or control. puter programs.

Directed at managers responsible for software projects, the report outlines typical problems in development and offers guidance on design and development, testing, maintenance, documentation and the use of software production tools.

The goal of the study is to eliminate those undetected errors in business computers that often cause significant financial loss and raise questions about computer negligence, Reymont said.
Improving DP Software Production

is available for \$5. Reymont is located at 29 Reymont Ave., Rye, N.Y. 10580.

Macro Assembler in ISO Pascal

NEW YORK - Advanced Computer Techniques Corp. (ACT) is offering a macro assembler written in ISO standard Pascal.

The assembler can be modified to run on an arbitrary host while assembling code for the target machine. Moreover, the assembler can be modified to run as a cross or native assembler, ACT

Dependencies on number formats in both the host and target CPUs have been separated from the main body of the assembler, making the product portable, the vendor said.

The macro assembler costs between \$40,000 and \$50,000 depending on the level of modification required, the vendor said from 437 Madison Ave., New York, N.Y. 10022.

'IDA' Provides Statistical Analysis

CHICAGO - The Interactive Data Analysis & Forecasting System (IDA)

— a Fortran package for statistical
analysis in business and economics is now being licensed, supported and enhanced by SPSS, Inc.

The package emphasizes regression analysis and time-series methods and a high level of user-computer interaction required to carry out such techniques.

Developed in 1972 at the Graduate School of Business at the University of Chicago, the package was originally aimed at classroom statistical instruction before its practical applications became apparent.

The package licenses on an annual basis: \$5,000 for the first year and \$3,000 for each renewal year. SPSS is at 444 N. Michigan Ave., Chicago, Ill. 60611.

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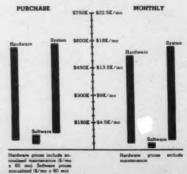
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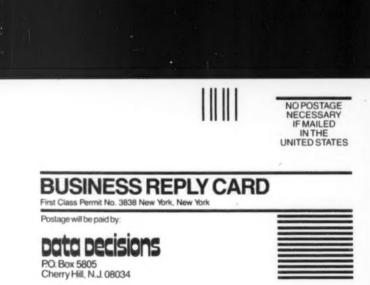
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OWN DINECTON

Aetna Network 'A Mess'

By Bruce Hoard

NEW YORK -The skyrocketing growth of data and voice communications has left the Aetna Life and Casuality Co.'s communications network in a according to John J. Donovan, mess, director of corporate DP for the firm.

The recent AT&T revision to its Wats tariff [CW, Sept. 22], which will cost Aetna 35% more on all its long-distance telephone dialing, is just one more piece in the company's large and complex com-munications puzzle, he asserted.

Data communications is the life blood

of Aetna," the director said. "We spend one dollar per policy per year on communications and that comes out to \$37 million

Speaking at the recent Information Management Exposition Conference (Info 80) her Donovan described the problems associated with maintaining a large communications network and spoke optimistically of satellite communications in the near future.

The recent AT&T revision to its Wats tariff [CW, Sept. 22], which will cost Aetna 35% more on all its long-distance telephone dialing, is just one more piece in the company's large and complex com-munications puzzle, he asserted. Breaking down cost areas, Donovan

noted that 69% of the firm's data communications expenses are incurred at its home office in Hartford, Conn., while 31% is expended in field operations.

The company is experiencing a 40% yearly growth rate in its number installed terminals and the ratio of terminals to employees has moved from one to 45 to one to six, he said. Such a rapid growth rate is a prime contributor to the unwieldy network "mess.

(Continued on Page 55)

In Datapro Survey on Teleprinters

Users Rate Teletype 43, Xerox 1700 Tops

CW Staff

DELRAN, N.J. - Teletype Corp.'s Model 43 and the Xerox Corp. 1700 series were the teleprinters rated highest by users in a Datapro Research Corp. survey just published in a \$15 report, "All About Teleprinter Termi-

Western Union Telegraph Co. was rated lowest in overall performance and ease of operation by five users of six unspecified models. The Teletype 43 took first place in overall perfor-mance, tied for first place in ease of operation and came up third in hardware reliability and key-board feel and usability.

On the usual Datapro scale of four points for "excellent," three points for "good," two points for 'fair" and one point for "poor," 16 users of 102 Model 43s gave that teleprinter a 3.8 average score in performance, while six users of units in the Xerox 1700 series gave those products a 3.7 average in performance.

Ease of Operation

The half-dozen Xerox customers also had the 1700 series turn up a first place tie in ease of operation - 3.5 average - first place in keyboard feel and usability - 3.7 average - and second place in both print quality and hardware reliability - 3.8

and 3.7 averages, respectively.

A Xerox subsidiary, Diablo-Systems, Inc., won the survey's only perfect score, getting a 4.0 average in print quality for its Model 1620 teleprinter. Diablo's 1640 series took third place in print quality with an impressive 3.7 average.

The Texas Instruments, Inc. Model 810 teleprinter won averages of 3.5 or better in overall performance, ease of operation, print quality, hardware reliability and maintenance service. And

TI's 743/745 models and the 765 tied for first place in ease of operation and keyboard feel and usability, respectively.

Other high-scoring models were Computer Devices, Inc.'s Miniterm 1203, which garnered a 3.5 average in performance and a (Continued on Page 55)

T/S Net Terminals Give Access to

McLEAN, Va. - An intelligent terminal system that gives the user time-sharing network access but handles the bulk of local processing tasks was announced recently by Innovative Technology, Inc.

The Powernet system features a cluster controller that serves as concentrator, message editor, manager of Powernet dialog and supervisor of the user interface, a spokesman stated. The system is based on Applied Digital Data Systems, Inc.'s (Adds) Regent 300 terminal.

Up to four CRT terminals can be attached to the cluster controller along with one or more printers, plotters and other I/O devices, the spokesman said. A version of Powernet based on Adds' Multivision intelligent terminal will reportedly be available soon

after Multivision is released this November.

Able to write and execute Basic and Fortran, the local Powernet

cluster features 52K bytes of random-access memory and dual diskette drives under a CP/M-(Continued on Page 54)

FCC Proceedings Pending To Open More MDS Channels

By Phil Hirsch

CW Washington Bureau WASHINGTON, D.C. Multipoint Distribution Service (MDS) is the "touchstone for development of future spectrum policy," Federal Communica-tions Commission (FCC) Chairman Charles Ferris said here last week. He was referring to three proceedings now pending before the commission aimed at making more channels available to MDS. Data communications users

would be directly impacted, since the new channels could provide broadband local loops in most of the nation's major cities, eliminating the shortcomings of telephone company-provided analog access circuits for many users

Ferris was the keynote speaker at the annual meeting of the Common Carrier Association for Telecommunications (CCAT), which has just changed its name

(Continued on Page 56)



CRT Terminal Family Offered to OEMs by DG

WESTBORO, Mass. - Data General Corp. has given OEMs the MPT fam-ily of intelligent CRT terminals, calling them software-compatible with DG processors ranging from the 16-bit Micronovas to the 32-bit MV/8000.

The MPT/80 terminal provides 60K bytes of dynamic random-access memory, a 12-in. CRT with 25 80-char. rows and an 83-key board. In the same cabinet, which is 22 in. wide by 12 in high by 20 in. deep, the MPT/83 ter-minal adds a 358K-byte floppy disk drive to the MPT/80 features, while the MPT/87 model has two drives for 5.25-in. dual-sided, double-density floppies totaling 716K bytes of stor-

programmable terminal models offers the full 96 char. Ascii set, a spokesman said, with a 14-key cursor control/numeric keypad and 10 user-definable function keys.

All MPTs execute a run-time version of DG's MP/OS real-time, multitasking operating system for support of Pascal, Fortran IV and assembly lan-

The keyboard for the three user-

Decision Data Offers First CRT

HORSHAM, Pa. — Decision Data Computer Corp. has unveiled the 3751-11, the first CRT terminal to be offered by the company.

The terminal is plug-compatible with the IBM 5251-11 and was designed to run on System/34 and System/38. It is less expensive than its IBM counterpart, costing \$2,800 compared to \$3,315, Decision Data claimed.

The 3751-11 has several features not found on the 5251-11, a spokesman added. These include a tiltable screen. adjustable key click, document holder, keyboard palm rest, automatic dimming, cursor position display, fieldconvertible numeric pad arrangement and expanded error message display.

Decision Data is located at 100 Witmer Road, Horsham, Pa. 19044.

LSI-11 Gains Serial Interface

MERRIMACK, N.H. - A serial synchronous data communications interface designed for use with its LSI-11 microcomputers is available from Digital Equipment Corp.

The DPV11 interface can be used with any of DEC's microcomputerbased products with an LSI-11 bus, including the PDP-11/03 and PDP-11/23 computers, the vendor claimed.

The product is a double-buffered program-interrupt interface that couples on LSI-11 bus with a serial syn-chronous modem using RS-232C or RS423 interface standards.

Protocols for the DPV11 are DDCMP, HDLC, SDLC and Bisync. The interface also enables users to develop X.25 links between LSI busbased systems and public packet-switched networks, a spokesman said.

The price for the unit begins at \$550, DEC said from Maynard, Mass. 01754.

guages. Each terminal has two R5-232C ports able to handle serial traffic at user-selected speeds as fast as 19.2K bit/sec, the spokesman stated.

MPT software reportedly includes disk formatters, a diskette copy routine, a bootstrap for programs residing in the floppies, a disk verification utility, a screen menu driver/editor, an asynchronous file transfer program, emulation of DG's Dasher D200 terminals, asynchronous interface rou-tines and power-up self-diagnostics. The MPT/80, 83 and 87 cost \$4,800, \$6,000 and \$7,100, respectively, and

deliveries will be within 90 days of order, DG announced from Rte. 9, Westboro Mass 01581.



Applications for the MPT family include OEM-designed distributed processing networks, industrial data collection, sensor I/O handling, laboratory and educational data processing.



THE ASCII TERMINAL **QUALITY YOU CAN SEE FOR**

Formation 4000 Gets Adapter

MT. LAUREL, N.J. - Formation, Inc. has announced the addition of communications capabilities to its Formation 4000 minicomputer system introduced earlier this year.

The F4700 Communications Adapter is said to enable the Formation 4000 to be used in a distributed data processing (DDP) environ-ment, acting either as a host or as a node in a network of systems.

The adapter emulates the IBM 270X SDA Type II and supports standard IBM software, according to the firm.

The F4700 costs \$3,000 from the firm at 823 E. Gate Drive, Mt. Laurel, N.J. 08057.

Handles 20 Message/Sec

Message Switch Runs on DG Nova

NEW YORK - Conversational Systems Corp. has announced availability of the SC/80 message switch, which has run at ITT for more than two

Based on Data General Corp.'s Nova minicomputer line, the SC/80 switch was called suitable for line concentration and front ending of larger com-munications systems. More than 20 messages averaging 500 characters in length may be switched in a single second, a spokesman maintained.

Modularity of the switch's software facilitates extensions of protocol support and throughput capacity with no sacrifice to accountability and performance features, he claimed.

The SC/80's stand-alone operating system supports a variety of disk offerings and can be configured for 16 to 128 asynchronous or synchronous

Priced in the \$40,000 to \$60,000 range, the SC/80 joins Conversational York, N.Y. 10001.

Systems' MS/80, which reportedly handles one-fourth the New York Stock Exchange's daily order volume [CW, Feb. 18], in the company's message switch product group.

The firm is at 132 West 31 St., New

Micro-Based Unit Measures Response Time on 3270 Nets

HANOVER, N.H. - DTSS, Inc. has unveiled a microprocessor-based response time monitor for IBM 3270-based networks that reportedly

records true computer system response time and transmits its summarized reports to the host computer.

The Tempo response time monitor at-

Use with an IBM or non-IBM computer

Our IBM 3101 is a simple-to-use, versatile ASCII terminal that can be attached to most business computer systems-IBM or non-IBM-or used to access many re-mote computing and time-sharing services

Whether your applications are budgeting, engineering, financial planning, interactive problem solving, or even simple data entry and retrieval, there's a place in your business for the 3101. Prices start at just \$1.995

If you're now using a hard-copy terminal to perform computer-base inquiries or calculations, the 3101 can splay your information faster on a high-resolution video screen. And if you're currently using a display, compare it to the 3101. We're so convinced of its high quality that we're offering a 15-day trial so you can see for yourself.

Order it with a toil-free phone call

You can order a 3101 by just calling our toll-free number. In the conti-

nental USA, call <u>800-431-2670</u>. In New York, call <u>800-942-1918</u>. In Alaska, Hawaii and Puerto Rico, call collect 914-696-6840. You'll talk to a specialist who can take your order or answer your detailed questions. De-livery of the 3101 can be as soon as 45

Out of the carton and into operation

When the 3101 arrives, you simply connect three modular elements-the display, the logic element and the keyboard-plug it in, position the setup switches and put it into opera-tion. It takes just a few minutes. sible setup switches in the keyboard let you select functions such as line speed, parity, scroll and reverse video. The 3101 weighs 38 pounds so you can move it easily.



Human engineering inside and out

The 12-inch diagonal screen can be swiveled and tilted to cut interference from overhead lighting. It displays a maximum of 1,920 characters in 24 lines. You can see and feel the quality, from its comfortable, solid keyboard to its crisp, easy-to-read



A low-cost printer, too

You can couple our 3102 printer to the 3101. You'll have the double convenience of displaying all your information, while capturing a hard copy of the data being displayed. The 3102 printer is lightweight and priced at just \$1,295, and is also available for a 15-day trial.

Selected specifications and prices

There are two 3101 configurations: character transmission and block transmission. Character transmission lets you use it like a teletypewriter. Block transmission provides sophisticated editing capabilities, such as insert/delete and full cursor control, along with field functions like blinking, high intensity and pro-tected fields.

The prices for the display terminal start at \$1,295 for the character transmission model, and \$1,495 for the block model. Volume procurements can save you up to twenty percent for either configuration of the terminal. Prices and current schedules subject to change.



The Tempo unit attaches directly between the 3270 keyboard and CRT.

taches directly to the IBM 3270 CRT terminal and intercepts signals passing between the keyboard and host computer. Based on those signals, Tempo measures the response time - the time that elapses from the pressing of any enter-related key at the terminal until the host computer unlocks the keyboard - and makes it available for entry of the next transmission.

The individual response time measurements, as well as summaries of groups of response times, are reported on a small strip printer attached to the unit.

The device costs \$2,450, the vendor said from 10 Allen St., Hanover, N.H.

Walk-In Maintenance For Lear-Siegler CRTs

ANAHEIM, Calif. - Lear Siegler, Inc. is offering a walk-in service facility for CRT terminals in 28 cities.

The Express Depot service allows Lear Siegler users to bring terminals in need of repair to a central site. The service can be performed while the user waits or within 48 hours, the firm said.

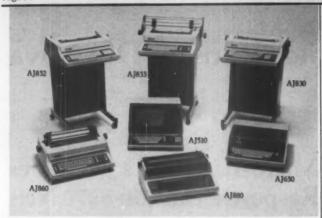
The repair service costs \$85/year, the firm said from 714 N. Brookhurst St., Anaheim, Calif. 92803.

Call 800-431-2670 (in N.Y. 800-942-1918) or send the coupon.

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				CW





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That also holds true if you need quiet thermal printers. Or CRT displays.

We've got them all. Together with media storage evices and the widest range of acoustic data couplers and modems available

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But if you want to take advantage of 1200 bps, we can certainly accommodate you.

Another thing. We won't sell you a terminal and forget you. Because we also lease, install, and service all the products that bear our

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nearest you for details: San Jose, CA (408) -2900; Rosemont, IL. (312) 671-7155; Hackensack, NJ (201) 488-2525. Or write erson Jacobson, Inc., 521 Charcot Avenue San Jose, CA 95131.

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Ampex Launches CRT Terminal With Two Modes

EL SEGUNDO, Calif. - Ampex Corp. has entered the CRT terminal market with the general-purpose Dialogue 80, a buffered editing terminal that operates in either conversational or block mode.

Dialogue 80 features a nonglare screen, detachable keyboard, brightness control and lowercase descenders, a spokesman noted.

The unit has an RS-232C asynchronous interface that operates up to 19.2K bytes, half- or full-duplex, as well as a standard serial printer inter-



The Dialogue 80

The Dialogue 80 costs \$1,149 from Ampex's Memory Products Division, 200 N. Nash St., El Segundo, Calif.

Z80s Act as IBM Terminals

DEXTER, Mich. - Winterhalter Associates, Inc. is offering a Remote Batch Terminal Emulator (RBTE) that lets Z80 microcomputers emulate IBM 3780, 2780, 3741 or 2968 remote batch

The RBTE allows users to transfer data files to and from mainframe computer systems or other batch terminals.

Data sates can reach 19.2K bit/sec; data integrity is provided using IBM's binary synchronous protocol for error detection and retransmission, the vendor said.

The RBTE costs \$500 and an operator's manual costs \$25 or \$15, the vendor said from 3825 Zeeb Road, Dexter, Mich. 48130.

Powernet Gives T/S Access

(Continued from Page 51)

compatible operating system sup ported by applications software such as payroll, general ledger, accounts payable and accounts receivable programs.

WP Capability

Innovative Technology also offers a word processing (WP) capability with Powernet augmented by two software packages for real estate users, an automated escrow closing system and a mortgage loan origination system.

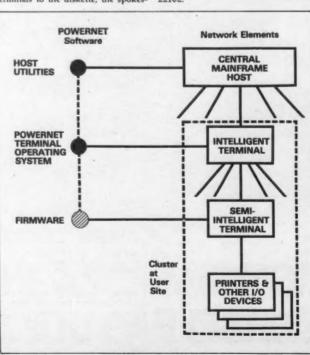
With Powernet, the user can function off-line, entering data from multiple terminals to the diskette, the spokes-

The cluster controller will edit the data and branch from entry screen to entry screen, and data can be batched automatically to the host computer for overnight processing.

But Powernet can also reduce a typical user's time-sharing costs by up to 80%, the spokesman claimed, and represents an alternative to purchasing a minicomputer for combined standalone and time-sharing capabilities.

A single Powernet terminal costs \$5,000

Innovative Technology's address is 7927 Jones Branch Drive, McLean, Va.



The Powernet System

Teletype 43, Xerox 1700 Teleprinters Rated Tops

(Continued from Page 51)

first-place 3.8 average in hardware re-liability, and IBM's 3767, which achieved a 3.6 average in both performance and hardware reliability.

Only two product groupings did very well in maintenance service, according to the Datapro report. Both TI's 810 and a group of unspecified Computer Devices teleprinters tallied 3.5 averages in that category, but the median of maintenance averages was 3.1 with Diablo's models faring worst of all at 2.2 for the 1620 and 2.3 for the 1640

Responses Used

Datapro received 285 usable responses from 132 users of 10,657 terminals by the survey's editorial cutoff date of April 25, the report stated. Many users employed a number of different teleprinters from a number of different vendors

About two-thirds of the terminals canvassed are keyboard send-receive configurations, Datapro noted, a fifth are automatic send-receive and the rest

are receive-only.
Nearly 70% of the units handle halfduplex communications, while close to half handle full-duplex (some handle both modes), a Datapro spokesman explained.

Datapro found that 15% of the teleprinters transmit faster than they print; 91% employ the Ascii transmission code; 70% use dial-up facilities; and 45% connect to acoustic modems.

According to the report, 70% of the users polled indicated plans to replace soon their existing teleprinters with other teleprinters while 5% said they had imminent plans for replacement by CRT terminals and 11% did not plan any replacements in the near fu-

Datapro defines a teleprinter terminal as "any device that combines a lowspeed printer with a communications

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Other models & unspended	3	10	3.3	1	2	0	0			2	. 1	0		0	1	1	0		1	2	0	0		1	- 1	1	0	30	1	2	1	-
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USERS' RATINGS OF TELEPRINTER TERMINALS

Weighted average (WA) is based on assigning weights of 4 to each "excellent" (E) response, 3 to each "good" (G) response, 2 to each "fair" (F) response and 1 to each "poor" (P) response. When an asterisk appears under the WA column, it means fewer than three responses were received, which Datapro regarded as invalid.

31 11 13 7 1 30 9 17 4 2 29 7 12 5 2 30 12 10 9 1 30 8 16 8

33 115 134 31 3 32 94 160 27 3 32 84 154 28 4 29 65 144 70 5 32 104 135 38

Leaves Aetna's Network 'A Mess' Fast Growth

142

4.249

32

(Continued from Page 51)

With a claims network consisting of 41 sites across the country and no distributed processing to handle them, Aetna chalks up a large telecommunications bill each year while spending two cents per physical message.

On the voice communications side, expenditures flip-flop, with 84% coming from field operations and only 16% from Hartford, Donovan noted, adding that 43% of Aetna's telephone calls are made within the organization.

SBS in Its Future

Looking toward future communications environments, the director spoke of Satellite Business Systems (SBS) a joint venture of Aetna, IBM, and Communications Satellite Corp. The company's first satellite is scheduled for launch Nov. 7:

"If it works, we will start using it in September 1981, primarily for voice communications," he said. "We will have earth stations in Hartford, Chicago, Houston and San Francisco." By the second quarter of 1982, SBS hopes to have added 56K bit/sec connecting lines to additional cities.

One of the big uses planned for the

satellite is teleconferencing, a practice that is "terribly expensive all by itself," according to Donovan. However, when coupled with the other uses Aetna has planned for the satellite, it becomes a more lucrative proposition,

Xeros 1700 Seri

All Others

Donovan expressed an opinion about teleconferencing: "It's more effective for nonemotionally charged meetings than for gatherings where somebody's performance is going to be evaluated."

Following the national trend, the company is making a move toward more distributed processing. It has installed IBM 8100s in "at least 69 offices" so far, he said. Aetna uses IBM equipment throughout the organization and its communications network employs Systems Network Architecture (SNA).

American Express

David Charles Jones, acting senior vice-president of the Systems and Communications Division of American Express Co., also spoke about his company's large data network.

With a host of subsidiary companies such as Fireman's Fund Insurance Co.

and the International Banking Corp. to support. American Express counts on its private, nationwide network to do the job.

That network entails some 200 terminals in over 30 countries and is used for electronic funds transfer, as well as voice and data communications, Jones said. It uses eight multihost IBM processors. Like Aetna, American Express also relies heavily on IBM for most of its hardware and software, including

Our IBM salesman has been laughing all the way to the bank for the past two years while we put to-gether our new network," Jones said. That network is consolidating six earlier networks into one master system.

That network developed from the quick and dirty" operation patched together by the company in 1967 that eventually grew to include 6,000 terminals for the verification of credit cards and 35 interfaces with non-American Express nodes.

Dual Acoustic Coupler Provides Both 1,200- and 0- to 300 Bit/Sec

SUNNYVALE, Calif. - Racal-Vadic Inc. has introduced a dual acoustic coupler that it said provides both 1,200 bit/sec and 0- to 300 bit/sec fullduplex asynchronous operation and is fully compatible with VA3400 and Bell 103/113-type modems.

The VA3413 is a portable unit that transmits over a two-wire switched network. Remote terminal users can step up to 1,200 bit/sec full-duplex mode using Bell 103-type protocols

and still operate at 0- to 300 bit/sec as well, the firm said.

The VA3413 is microprocessor-controlled and automatically detects the called modem.

The VA3413 is compatible with Racal-Vadic's VA3400 modems including the VA3405, VA3415, VA3455, VA3450 and the VA3467, The unit costs \$895 and is available from the vendor at 222 Caspian Drive, Sunnyvale, Calif. 94086.

FCC to Rule on Opening More MDS Channels

(Continued from Page 51) to The MDS Association.

Ferris explained that one of the three pending FCC proceedings — Docket 80-112 — involves reallocation of the 2,500 to 2,690 MHz frequency band now allocated to educational broadcasters and private microwave users on an exclusive basis.

The educational broadcasters, who provide what the commission calls Instructional Television Fixed Services (ITFS), have 28 channels, while the private microwave users have three. The latter systems are known officially as Private Operational Fixed Microwave Systems, usually abbreviated OFS. MDS carriers presently operate in a different frequency band (2,150 to 2,162 MHz).

Under the FCC's proposed scheme, MDS would keep its present allocation while sharing the 2,500 to 2,690 MHz band with ITFS and OFS. But the exclusive allocations now granted the latter two services would be replaced with a "primary" allocation system.

Eleven of the 31 channels would be reserved for educational broadcasters, and 10 each for MDS and OFS. In each case, if the channels were not used by a primary grantee, they could be reassigned to either or both of the other two groups.

other two groups.
Giving additional channels to MDS could lead relatively quickly to provision of multiple broadband local loops throughout the country. According to the FCC, MDS operations have been licensed in 131 locations, including

most of the nation's major cities, and some 400 applications for additional

networks are pending.
Data submitted to the FCC in Docket 80-112 by Microband Corp., the largest of the MDS carriers, now a subsidiary of Tymshare Corp., indicates that these networks can support two-way data transmission at speeds of 500M bit/sec or higher, depending on network configuration. MDS is now used primarily to distribute pay TV programs.

'Ripe for Decision'

In his speech to The MDS Association, Ferris said that Docket 80-112 would be "ripe for decision" by the end of 1980.

While he remains "open" on the

question of whether ITFS should have exclusive use of its existing frequency allocations, the FCC chairman made it clear he favors the idea. This is significant because ITFS broadcasters are violently opposed to sharing their frequencies, and have mobilized substantial support in Congress and within the new Department of Education for their view.

"In at least 25 of the top 50 metropolitan areas," Ferris said, 10 or more of the presently allocated ITFS channels are unassigned. "And in each of these cities there are at least two mutually exclusive applications for an MDS channel."

He admitted that the actual use of ITFS may not accurately reflect demand for the service, echoing a point stressed by the educational broadcasters who point out that it is more difficult for them, than for MDS carriers, to raise the money needed to get on the air.

But Ferris added that a low-power TV service proposed earlier this month by the FCC — which would permit additional use of UHF and VHF television channels — may be "a cheaper, more effective way to satisfy some of the educational TV demands" than the present exclusive allocation of channels to ITFS.

A related proceeding, Docket 80-113, proposes a number of changes in existing FCC rules designed to prevent TV stations from interfering with each other. If adopted, Ferris said, these rule changes will permit at least two MDS channels, rather than one, in virtually every major city.

Application Procedure

The commission is also proposing to simplify the procedures by which it chooses among contending applicants for the same local frequency.

"The average delay caused by our present comparative hearing procedure in MDS is three years," Ferris explained. "The legal fees to MDS applicants exceed \$50,000, and the FCC's own administrative costs soar past \$5,000 per hearing.

"More important, the MDS channel goes unused while the process is grinding to its ultimate resolution. This process benefits no one, except possibly those entrenched firms most capable of using technical barriers and delays in administrative processes to their own advantage," he added.





Management And Distributed Computing



By Robert W. Shirey



By Robert W. Shirey



Part 3: Structure and Strategy 'In the development of information systems, the technical interests of staff experts must be submerged to the interests of managers, but the two must cooperate in developing systems. Staffs must avoid rushing into informational systems design without management participation and approval. Managers must not abdicate their responsibility to staff in this work."

—George A. Steiner, 1969

The forces behind distributed computing arise from more than just technological innovation. They also arise from human desire to avoid the bureaucratic inefficiencies inherent in large, centralized organizations. Designing a distributed computing system (DCS), therefore, involves more than just technical issues and physical dimensions. Sometimes the biggest design problems are technical, but other times technical issues are secondary to organizational ones. In some cases, the two classes of issues can be separated, but in no case should either be ignored.

So DCS design requires several specialized viewpoints. But to integrate the specialities, it also needs a broad, general viewpoint, the viewpoint of top management. Top management means one or more of the senior executives who are accountable for the organization's total efforts and total results [Stei69]. Top management must orchestrate the DCS components to make the system support the organization's style and goals.

Our society puts great pressure on everyone, regardless of rank, to be up-to-date and use the latest technology. In the 1960s, when computers were the latest management fashion, this pressure caused wasteful spending. Today, the distributed computing trend could also lead to uncontrolled and uncoordinated growth unless pro-

curement and development are controlled. Uncontrolled innovation is proper at a certain stage of organizational evolution, but only top management can judge this.

Top Management Role

Top management should participate directly in the design of distributed computing systems. Top management guidance is needed to avoid problems that arise when dispersed systems are allowed to grow in ad hoc fashion:

• Intersystem Incompatibility. Two kinds of mismatches occur:

Between information systems.
 Between an information system and the work system or process it supports.

• Cost Ineffectiveness. A system may be cost effective from a local viewpoint but be suboptimal for the organization as a whole, or vice versa. Intersystem incompatibility limits an organization's productivity and growth. Two incompatible systems cannot be joined to communicate or to share resources. The problem is usually a difference in either machine architectures or data definitions. These differences arise when there are no organization wide standards for data elements, software or other system components.

The other kind of incompatibility, between an information system and its working environment, is the common result of lack of user involvement in the system design. This second kind of incompatibility leads not only to inefficiency but sometimes to rejection of the system (and its sponsors!) by the intended users. When this happens, even a technically well-designed system must be considered a failure.

Some fairly general but still quite useful guidelines for DCS design have (Continued on In Depth/2)

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

(Continued from In Depth/1) emerged from the experiences of the many organizations that already use some form of distributed computing. The next section reviews the experiences of four practitioners in private industry.

Organizational Congruence

Designers of new systems often are tempted to build an ideal system. This urge takes many forms. Sometimes, the designers try not only to fix all the faults in the old system but also to reform the organization that uses the system. In other cases, the designers seek a universal solution, the "common system" approach.

Both approaches can be very expensive. Reynolds says: "I have found that it is indeed true that making sys tems fit the special requirements of the individual organization is considerably more cost effective than trying to change the organization to fit some data processing operations. This is true even in cases where the programming itself is quite expensive

Sharma says it more directly: "The goal of a designer should be to fit [distributed computing system] to the organization and not vice versa, as many case histories show [Shar78].

Even within a single organization, different applications may need differ-ent approaches. For example, field offices might be geographically dispersed with decentralized management, while accounting and payroll are centralized at headquarters. So the organization might require several systems, each distributed to a different

Hewlett-Packard Co. is an example of a multisystem organization. It has built a variety of coexisting systems centralized, decentralized and distributed - including a 110-node worldwide teleprocessing network. Van Ren-nsalear summarizes HP's DCS experi-"The most significant lesson we have learned . . . is that there is no one best way to process data [VanR79]." He also names the "10 big problems HP had to face to evolve from totally centralized computing to its present mix. His list has been rearranged here to emphasize key DCS design issues.

 Centralization vs. Decentralization. Establishing centralized planning to coordinate decentralized development work. Adapting to local needs while keeping companywide compatibility.

• Flexibility and Growth. Designing for each response to organizational change, system expansion and new information needs without losing control

• User Involvement. Involving usermanagers in system design and opera-tion. Educating users to treat data as an important, shared resource.

· Resource Balance. Training and assigning the computing staffers. Avoid-

ing unnecessary duplication of effort.

• Control and Coordination. Setting, promulgating and enforcing standards that are companywide. Maintaining

security and privacy throughout a dispersed organization.

The experience of the Vickers Engineering Group contrasts sharply with Hewlett-Packard's. Vickers began with totally decentralized data processing; each of 20 autonomous divisions did its own computing [Shep78]. While HP evolved from centralized computing to largely decentralized DCS design and operation, Vickers did the op-posite. HP puts "data close to the source of the information and the control of processing close to the manager responsible for the function being performed."

But Vickers doesn't believe that hardware and software have reached the stage where [data] is generally usable" when distributed to the place where it is most used. Also, Vickers avoids decentralized operational control and development of computing in order to avoid coordination problems. Even when dispersed and decentralized systems have a local manager, "we have found it works best if the local [computing] managers are people who see their prime career path in the central organization.

Vickers' approach is similar to one suggested by Kelsch for combining central and distributed computing systems [Kels78]. "The end user should have responsibility in a distributed system [only] for local, nontechnically complex operational and application functions . . . Technical responsibility [should] be centralized."

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HP believes instead that decisions should be made by people who are closest to the problems. Organizationally, this might imply either centralization or decentralization depending on the kind of problem.

In summary, the issue of centralization vs. decentralization appears again and again, and the next section discusses why. Even among those who agree that a DCS should match the organization, there is still disagreement on three points: (1) What does or should the organization look like?

(2) How should a DCS be managed as opposed to how it is functionally designed?

(3) How much of a match is feasible technically, economically, psychologically and politically?

Part 1 of this series pointed out that

Part 1 of this series pointed out that in DCS design there are so many alternatives it is almost impossible to analyze them properly. In fact, "With the continuous inundation of products and technological advances, it turns out that almost anything we want to do as a manager can be implemented technically [Sher79]." So DCS design is constrained not by technology but by management philosophy.

The centralization-decentralization (C-DC) issue boils down to personal preferences. Glaser listed four major organizational issues facing management in its use of computers in 1970 [Glas70].

(1) Decentralization of personnel,

hardware and control.

2) Organizational placement of data processing management.

3) Organizational structure of data processing staff.

Procedures for allocating data processing costs to users.

Glaser said that the C-DC issue was the most controversial of these, and it remains so today. The controversy feeds on two causes:

• Complexity. The degree of centralization has many strong tangible and intangible effects — functional, economic and psychological — on computing systems and on the people who build, operate and use them. So it is seldom possible to prove that one approach is better than the other.

• Emotion. Organizational design involves questions of style, and style is a constantly changing and very personal matter. So it is seldom possible to find one design that suits everyone and will stay in fashion.

Designers must not ignore the cognitive differences between centralist and decentralist positions. "You actually think differently when you do your planning while standing at the central processing unit... than you do if you put yourself at the source of the data [Vick77]." Any organizational design, therefore, must effect a compromise in order to be successful. "No organizational structure or policy will work unless accepted by the majority of people affected by it as logical, satisfactory and workable [Glas70]."

The general management literature can help computing specialists gain perspective on system design issues. The management literature on organizational design tends to discuss the decentralization issue in terms of who has authority and how that affects decision making. This emphasis serves to balance the computing literature which discusses the issue in terms of where resources are located and how that affects costs.

Luthans puts the centralization vs. decentralization issue in three successively larger contexts [Luth73]. First, the C-DC issue is only one aspect of the vertical analysis of organizations; another aspect is flat vs. tall, or how many layers there are. Second, there is another dimension, horizontal analysis. It concerns the amount of departmentation or specialization and split between line and staff functions. There can also be vertical vs. horizontal design conflicts. Third, there can be different types of structure: geographical, functional and decision-making.

Dale names the classical principles of organization design that underlie Luthans' distinctions [Dale67]:

The Objective. The organization and each subunit need one.
 Coordination. Always required.

Specialization. Similar functions should be grouped.

• Unity of Direction.

Unity of Command.
 Authority and Responsibility.
Should be commensurate.

 Delegation. To the lowest compe-(Continued on In Depth/4)

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(Continued from In Depth/3) tent level.

- · Span of Control. Between three and eight.
- · Chain of Command. Short as possible.
- · Balance. No function emphasized at expense of others.
- Change. The unchanging characteristic.

His delegation principle especially applies to the C-DC issue: "Each decision should be delegated to the lowest competent level - that is, to the lowest point in the organization where the incumbent of the position may be expected to be aware of all the factors pertinent to the decision and where the results on which he is judged will encompass all its consequences.

Division of Labor

The specialization principle is often called division of labor. Drucker says, Decentralization, as the term is usually understood, means division of labor and is nothing new [Druc60]." He says that decentralization at a macro level has three purposes or claimed ad-

1) Faster decisions with less confusion over authority.

2) Less conflict of interest between

headquarters and subunits.

3) Less "edict management" (dictatorship).

Dale states another advantage: "The ultimate result of the decentralization of decision-making . . . tends to be an

increase in the profitability of the investment in administrative expense [Dale67]." He says this occurs in three

· Positive Short-Term Effect. Subunit morale improves and raises profits.

• Negative Intermediate Effect. Profits decline because some subunit administrative costs increase

• Positive Long-Term Effect. Overall profits increase after a new equilibrium is achieved.

Measuring the effect of decentralization is difficult unless there is a control for comparison. It is also difficult to measure the degree of decentralization, although Luthans states four objective criteria [Luth73]. Decentralization is greater when:

• More decisions are made lower down the management hierarchy.

• Important decisions are lower down.

· More functions are affected by the decisions made lower down.

· Fewer approvals are needed for de-

Luthans also gives seven guidelines for determining the optimum degree of decentralization of decision-making.

• Information Access. Decisions should be made where the relevant facts are available or can be most easily assembled.

 Executive Ability. Decisions should be made by those who have the required skills.

• Time Horizon. Decisions should be made lower down when local conditions require speed

• Interaction. Decisions should be made higher up when a local activity interacts with outside activities.

· Significance. Decisions should be made higher up when their importance and consequences increase.

• Executive Load. Decisions should be made lower down as executives become busier

• Staff Efficiency. Decisions should be made lower down to improve initiative and morale.

Decision Methods

It is not possible to pick one organizational design that will apply in all computing situations. Yet there do exist systematic means for deciding the C-DC issue for each separate part of an information system. This section describes three papers that take a com-prehensive, systems approach to the problem. Glaser's paper, exceptional for its clarity, is rather short and gives only broad design criteria and guidelines [Glas70]. Still, only a few statements in it have been overtaken by events of the last 10 years.

In a longer paper, building on Glaser's work and on other studies [Rock76a, Rock76b], Rockart, Bullen and Leventer present a detailed, qualitative decision model [Rock77, reviewed in Saxt78b, Saxt78c]. Their model is long on human factors, but short on technical issues. In contrast, Slonim, Schmidt and Fisher have a quantified decision model that deals

(Continued on In Depth/6)

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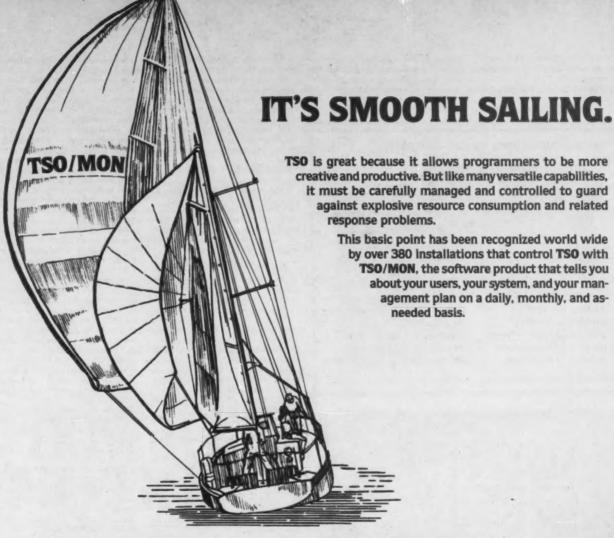
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IN DEPTH

(Continued from In Depth/4) directly with data base distribution [Slnm79].

The system approach can be applied. Glaser used it in a short paper that clarified the C-DC debate on computer

The P-15 Data

orders for your

products. It will

Concentrator permits

remotely key their own

simultaneously answer

up to eight calls and

provide immediate

your customers to

resources. His paper begins like many others by presenting the popular pros and cons. The usual management arguments for centralization are:

Reporting Requirements. Makes data consolidation easier.

storage on computer

customers may key their

orders on a hand held

terminal or simply use

their push button dial

telephone. Call or write

diskettes. Your

for complete

information.

· Economies of Scale. Reduces hardware and development costs.

• Personnel Shortages. Reduces im-

pact of specialist turnover.

· Global Standards. Enhances executive control. Similar points are mentioned elsewhere [Reic68].

The usual arguments for decentralization are:

• Local Solutions. Better problem familiarity.

· Response Times. Faster for local needs

• Management Responsibilities. Local profit centers.

As Thierauf comments, "The reasons advanced for centralization are generally based on efficiency. In contrast, the arguments for decentralization stress effectiveness [Thie78]."

Three Elements

Rather than debating these points, Glaser suggests dividing the C-DC issue into three major elements:

· Equipment. Choice, location and custody

· Staff. Skills, availability and moti-

vation. Decision Authority. Clear responsibility for questions of (1) long-range planning, (2) project approval, (3) system design, (4) personnel management

and (5) outside contractors. Then he discusses seven primary de-

cision factors: • Total Cost. Development, operations and maintenance

. User Satisfaction, Services and benefits.

· Personnel Utilization. Scarce technical talents.

• Personnel Hiring. Attraction and

· Project Selection. Rational decision mechanism.

· Resource Sharing. Opportunity for

common system. · Future Adaptability. Technical and

economic changes.

As secondary factors, he lists information flow requirements for organizational subunits, need for timely operating data, data communications availability, state of the art in data processing and uniformity of current or-

ganizational practices.

Glaser concludes with a guideline for how to allocate tasks between a company's centralized corporate office and decentralized division offices. Work should be done locally whenever possible; it should be done centrally only when the economics or some other performance requirement dictates so." He reasons that computers exist to solve problems - quickly, unobtrusively and inexpensively. To do so requires close, direct cooperation with those who confront and understand the problems and who are dedicated to solving them. Such people are usually decentralized.

Ready-to-Use Method

A qualitative decision tool exists. Glaser's paper provides many useful insights, but Rockart's paper goes on to provide a packaged, ready-to-use decision method. Rockart's group saw

a need for a tool, a "rigorous, prefera-bly quantitative, model" for deciding the decentralization issue. As a start, they built a qualitative model that might be further developed into a quantitative tool. The model has two main features:

 Decomposition Strategy. A three-dimensional approach to breaking the decentralization decision for an entire organization into a series of smaller decisions for organizational subunits.

• Factor Tables. A collection of deci-

sion guidelines based on the notion that there are certain universal principles affecting the decentralization de-

Rockart got his decomposition strategy and factor tables primarily from empirical work - interviews and case studies - but also from management literature. Like Glaser, he made a list of advantages and disadvantages, but with two differences. First, Rockart's list has more than 100 items, broken into categories [see either Rock76b or Rock77]. Second, he lists pros and cons not only for centralized and decentralized systems, but also "distrib-uted systems," defined as "interconnected computers (CPUs) with their own mass storage, each at a different organizational location" and also defined as "partly centralized and partly decentralized."

His decomposition strategy divides an organization's information systems functions into smaller, independent subfunctions for which the C-DC de-cision is easier to make. The strategy's

three dimensions are:

· System Activities. The work of creating and maintaining an information system includes three activities:

Management. Planning and controlling the system.

Designing, imple-Development. menting and installing.

Operation. Running the system: in-

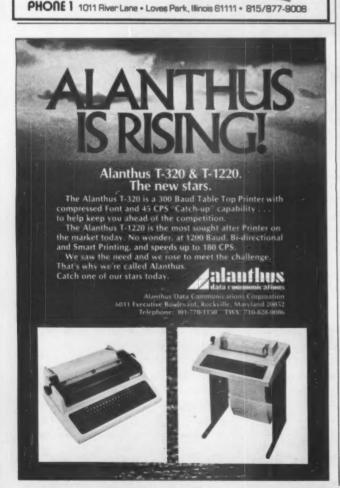
put, processing and output.

Organizational Subunits. These might be divisions or departments in a company

· Application Areas. These are tasks such as inventory, production control, payroll and billing that are performed nearly every organizational subunit. Rockart terms these "logical ap-plication groups (LAGs)." Each of the three system activities has

a different nature, so a decision to decentralize one does not force decentralization of the other two. However, Rockart believes that management is the "overriding process" with primary influence on all of an organization's information systems. So the manage-ment process should be indivisible, not separated across LAGs and subunits. But development and operation activities are closely tied to each other and to LAGs and subunits by the need for maintenance and enhancements.

Each LAG in each subunit may need a unique organization for its development and operation. Each LAG is supposed to be a logically separate, cohesive task with only minimal, well-defined information transferred between LAGs. Each LAG has its own



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characteristics and requirements. Similarly, organizational subunits are each different and deserve separate consid-

Rockart's decomposition strategy thus divides the C-DC problem into

these independent subproblems:

One Management Decision. A single C-DC decision for all system management activity.

 Many Development/Operation
Decisions. A separate C-DC decision
for the combined development and maintenance of each LAG in each organizational subunit.

Rockart's model then considers each subproblem in greater detail, including resources and subprocesses. For each part, the model determines a range of effective alternatives by applying the factor tables. These tables judge char-acteristics of each decision unit in terms of direction and strength of tendency toward centralization or decentralization. Finally, the factor tables are "visually integrated" to reach a decision. If the decision maker could assign weights to Rockart's factors, this method could be quantified.

Although Rockart's model has more detail and structure than Glaser's simple guidelines, it also has several weaknesses as a decision tool: • Subjective Judgments. Application of the factor tables is subjective. No metrics or range guidelines are given.

 Management Bias. The factors seem to favor the management viewpoint. Important technical issues could

· Overlapping Criteria. The factor table categories are overlapping. Funcnents and design issues. The other is the conflict between viewpoints, such as the performance vs. economics conflict between technicians and manag-

Slonim, Schmidt and Fisher explicitly recognize both problems and propose decision method to solve them [Slnm79]. First, to reduce the multidi-

ences between managers and technicians "by providing a common meeting ground for determining priorities and trade-offs." The seven evaluation

1) Operational characteristics. 2) Performance characteristics.

3) Update characteristics.

4) Retrieval characteristics.

Economic characteristics.

Data base size.

User characteristics.

The authors then combine the 11 system types and seven evaluation groups in a series of matrices. For each evaluation group, they present a rectangular matrix that has the several factors along one axis and the 11 system types along the other. Each matrix position contains a value between zero and five that indicates to what degree that par-ticular type of data base distribution enhances the evaluation characteristic. Finally, the factor weights are applied, and scores are totaled for each system

This quantitative decision method has the advantage that the weights and scores can be adjusted for the circumstances of particular applications. But the method has the disadvantage that there can be substantial disagreement

(Continued on In Depth/8)

'A successful decision method for the centralization-decentralization question in distributed computing must solve two unavoidable problems. One is the bewildering complexity of DCS components and design issues. The other is the conflict between viewpoints, such as the performance vs. economics conflict between technicians and managers."

tional, economic and psychological issues are mixed together and aggregated at several different levels.

The next section presents a decision method that partly avoids these prob-

A quantitative decision tool exists that balances several viewpoints. A successful decision method for the C-DC question in distributed computing must solve two unavoidable, real-world problems. One is the be-wildering complexity of DCS compomensional complexity of a DCS, they focus on the data base dimension. To distinguish between degrees of centralization or decentralization, they define the 11 types of distributed data base systems that were listed in Part 1 of this series

Second, they organize DCS characteristics into seven evaluation groups.
Each group contains several factors.
Each factor in each group is weighted on a five-point scale. The purpose of their scheme is to reconcile the differ-

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(Continued from In Depth/7) over those values. The weights can be disputed when system objectives are disputed.

The matrix values depend on interpretation because, as mentioned in Part 2, for each DCS advantage, there seems to be a counterpart disadvantage. Furthermore, the group and factor definitions in the paper are often ambiguous. They need clarification before the method can be widely used. Using the particular weights and ma-

trix values in the paper, the authors reach some interesting general conclu-

· Partitioned systems are best baianced. Their strong areas are operations, updates, economics and user characteristics.

· Replicated systems work best in special cases. They have many strengths, but should be avoided when

data base size is volatile.

Distributed computi Distributed computing bypasses many points of the C-DC debate. Kaufman points out that by combining new technology and new design concepts, distributed computing makes possible data processing configurations that, in a classical sense, are neither centralized nor decentralized [Kauf78]. He says distributed computing "seems to offer the opportunity to gain the advantages of centralized processing in an environment that has a decentralized personality.

If Kaufman is right, if distributed computing can suit many organiza-

tional styles at once, then the decentralization debate will subside and become more rational. The element of emotion will be removed, and deci-sions will be made on functional and economic grounds.

economic grounds.

Kaufman goes further. He argues that even when a straightforward economic analysis is unfavorable to distributed computing, the analysis can be outweighed by the ability of distributed computing "to create happier relationships." He says that local computation is the period for the uncertainty of the says that local computation is the period for the uncertainty of the says that local computation is the period for the uncertainty of the says that local computation is the same for the uncertainty of the un puting is happier for the users than centralized computing, even when the former is less efficient or slightly more expensive.

To achieve that happier state will require changes in most organizations, and organizational change requires strategic planning. "The key to the successful use of distributed information systems will involve the proper blending of centralized controls and decentralized responsibilities [Wins-

There are four ways to manage computing resources and applications [Stat78]:

 Classic Monolithic Approach. This approach centralizes both the management of computing resources and the management of computing applica-tions. Data processing facilities are totally centralized, using mostly batch processing and central data entry.

· Service Bureau Approach. This ap proach keeps resource control centralized, but decentralizes management of computing applications. Computing facilities are accessed by either over-the-counter job submission, remote batch job entry or dumb terminals.

 Vertical Distribution Approach.
The approach reverses the previous one. Management of computing resources is distributed, and local processing is supplemented and extended. by a central computer facility. Applications management is centralized. Users access central master files through smart terminals and satellite computers.

· Horizontal Distribution Approach. In this approach, computing resource management is distributed and application management is decentralized. The systems have an end-user orientation and use distributed data bases and

networking.

Of these four, the classically centralized approach applies to most organizations, and some have set up service bureaus or are evolving through verti-cal distribution. But almost none have achieved a mature, horizontal DCS.

This section has suggested how to analyze the key strategic design issue of centralization vs. decentralization. The next section goes on to discuss other aspects of the general process of strategic planning for distributed com-

"With technology having reached its present state, I think every corporation should have a task force at the highest level to determine its strategy in distributed processing.

James Martin, 1978. (Continued on In Depth/14)

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(Continued from In Depth/8)

Rockart identifies the setting of strategy and standards as the key management task. Strategic planning, more than any other process, determines the long-term success of an organization's computing systems. Rockart's decision method for centralization vs. decentralization is a tool for part of that strategic planning process.

Other authors have the same thought about strategy. They say that, although it seems obvious, organizations must make an effort to plan, because usually nothing turns out well without

a plan.

In most cases, the authors do not say how to make strategic plans. Computing literature contains planning methods for handling the details of software engineering rather than global organizational issues. Management literature, until recently, did not focus closely enough on computing problems to be applicable to designing distributed computing systems.

This section reviews five recent articles by professional managers who are deeply involved in computing. Each article tells how to do some part of strategic planning for distributed com-

Head outlines what should be in a

strategic plan for information systems and how to organize the planning effort [Head 78].

Nolan outlines the organizational stages of growth in data processing and gives explicit benchmarks for determining what stage a particular organization reached [Nola79].

Appleton analyzes the two basic strategic approaches to managing distributed computing systems [Appl78].

Statland details how distributed computing changes the roles and staff requirements of the user and MIS organizations [Stat78]

Macintosh and Daft present research findings that offer a way to understand user information needs at a stra-

tegic level [Maci78]. These five sets of planning guidelines, when merged with the cost management guidelines that follow in Part 4 provide the basis of a strategic plan ning method for DCS. An overall structure, into which the various guidelines could be assembled, can be found in the extensive text by Steiner [Stei69]. His book "presents actual how-to-do-it programs on starting and maintaining better long-range planning.

In Head's view, strategic planning sets the basic, long-range direction a system should take, anticipating the type and volume of computing in the next five to 10 years. In contrast, a short-range, tactical plan concentrates on ensuring that sufficient computing resources will be available to get the work done in the next budget year or two. Put another way, strategic plans deal with the overall problems of broad-scale designs as opposed to immediate implementation problems in the field.

To set strategic plans, the system planner must study three things, all of which contain uncertainties:

 Organizational Policy. Since a sys tem must match the organization it serves, the planner must consider the of management, employees, stockholders, constituents or users.

· External Forces. The system plan must anticipate changes in the environment due to many causes: competition, laws, fashions and innovations.

· Future Technology. The planner must gauge what systems tools and building blocks will be available dur-

ing the planning period.

Head outlines the contents of a strategic systems plan, and similar outlines are found in Steiner. Head also lists 10 ideas that contribute to sound strategic planning:

· Small, Rapid Steps. A series of payoffs and checkpoints rather than one grand, ultimate target.

· Alternative Courses. A range of options to counter uncertainty.

· Organizational Interfaces. A link that synchronizes with other plans.

 Top Management Briefings. A document format intelligible to decisionmaking executives.

· Formal Reviews. A mechanism for reiterating the planning process.

· Utilization Forecasts. A system for determining the useful life of installed equipment.

• Fixed Responsibilities. A structure that focuses and motivates planning efforts.

· Rotating Assignments. A way to expose key people and gather fresh in-

· Research and Development Budgets. A program to evaluate new equipment and techniques.

Intelligence Activities. A review of comparable and competitive systems.

Six Growth Stages

Before setting a strategy, an organization should determine where it is and what lies ahead. Nolan has a method for this. He defines six stages of growth from first usage to maturity.

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The stages are defined in terms of four computing growth areas: the applications mix, the data processing organization and control structures, and user awareness. The key step is the stage 3 "transition point" from computer management to data resource management. Quickly summarized, the six stages are:

1) Initiation. Building low-level,

cost-reduction systems.
2) Contagion. Widespread, uncontrolled user innovation.

3) Control. Reorganizing to professionalize computing.
4) Integration. Rebuilding with data

base and telecommunications tools.

5) Data Administration. Sharing data resources.

6) Maturity. Matching completed

storage and processing (i.e., data base) functions. These three functions are necessary to accomplish any application. Yet these three differ in needed skills, technology and resources, and each requires individual management attention to perform well.

Appleton contends that a DCS should use functional management control. "Given the complicated interlinkage and interdependencies of [DCS] networks, the appropriate management strategies are not applica-tions-oriented. Indeed, to use an application approach is to be counterproductive to the basic objective, which is to construct systems that can survive the natural dynamics of the business Actually, the ultimate objective of dis-tributed data processing is not just to ware maintenance, data communication and procurement.

• Quality Assurance. Definition and enforcement of development standards.

computing is distributed. Statland's strategic plans place development and production "with the user when it is appropriate, yet still provide overall coordination and control through a central MIS function that promulgates standard procedures for systems development, testing and op-

erating practices and exercises annual budgetary approval over all development projects." There are two main re-

• Line functions decentralize. Production functions either disappear or are done by users:

Data Entry. Done by the user at his terminal

Job Control. Incorporated in soft-

Computer Operation. Done by local (Continued on In Depth/19)

'Appleton contends that a DCS should use functional management control. "Given the complicated interlinkage and interdependencies of networks, the appropriate management strategies are not applications-oriented. Indeed, to use an application approach is to be counterproductive to the basic objective, which is to construct systems that can survive the natural dynamics of the business."

systems with organizational information flows

To reveal the current stage, Nolan gives two sets of benchmarks. The first set, which looks at the overall organization, uses two measures: the historical ratio of DP expenditures to organizational growth, and the mix of DP technologies in use. The second set separately characterizes each of the four growth areas.

Nolan's benchmarks are important for two reasons. First, they can be quantified and objectively applied. Second, as Nolan reminds us, managers know that "if you can't measure it,

you can't manage it."

Finally, Nolan has a strategy for how strongly financial and performance management controls should be applied to computing and data resources at each strategic growth stage. The balance between control and "slack" (lack of control) determines the rate of computing growth. The proper balance at each stage enables the four growth areas to evolve together.

Process-Oriented Strategy

Nolan's stage theory is a method for planning how much management control to apply and when to apply it. Appleton complements Nolan by analyzing two strategies for how or where to apply management attention:

• Project-Oriented Strategy (Application Control). Views the computing environment as a set of unique, customized, nearly independent applications, developed to meet distinct sets of information needs. Each application is separately engineered, developed and maintained.

• Process-Oriented Strategy (Functional Control). "Attempts to ignore the individualities of computer applications in favor of their similarities. This strategy develops standard processes to perform input, output and survive, but to help the business respond more quickly and cost-effectively to natural forces for change. Applications strategies have difficulty just surviving.

Appleton implies that process-oriented management control is what enables a DCS to achieve the best of both centralization and decentralization. His arguments can be summarized as follows

• Cost Control. Functional control allows standard costing through identification, isolation and separation of overhead expenses and direct expenses for services. Consequently:

· Overhead can be centralized for economy of scale.

 Direct services can be decentralized for better use.

· All planning can use comparable standard cost units.

· Change Control. With change management as a design criterion, a system with standard input, output and data base processes can provide:

 Rapid implementation or customization to satisfy decentralists.

· Compatibility to satisfy centralists. · Easier maintenance to satisfy all users.

Realignment, Retraining

Evolution from centralized to distributed modes of computing management strongly impacts staff assignments and skill requirements. Statland describes how he would realign the computing staff. In the traditional centralized mode, the computing manager has four responsibilities. Two are line

• Development. Design, programming and maintenance for applica-

• Production. Data entry, job control and computer operation.

The other two are staff functions: • Technical Support. System soft-

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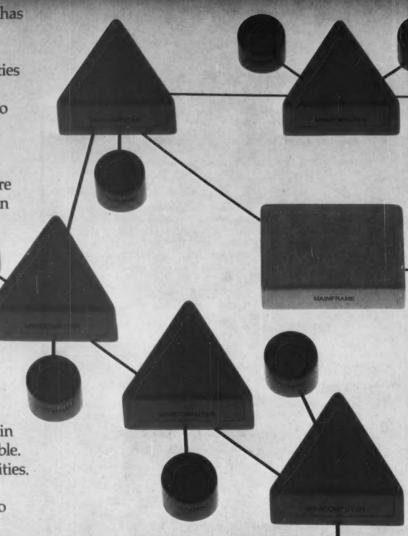
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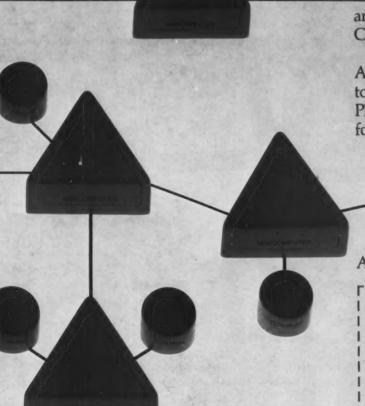
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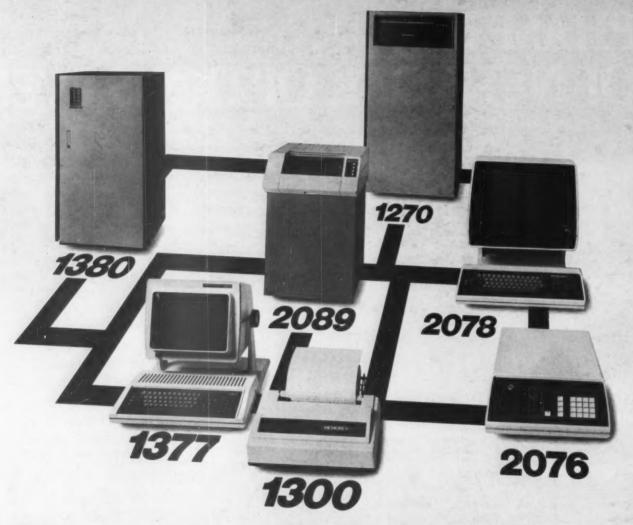
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IN DEPTH

(Continued from In Depth/15)

· Staff functions intensify. The old central organization shrinks in size but becomes more skilled. It focuses on technical specialties, system evaluation and overall planning.

Wenig advocates sending everyone line and staff people, managers and technicians — through a common course of "awareness education" in distributed computing [Weni79]. His goal is a common basis of knowledge among the professional staff and the elimination of popular misconceptions. For the technicians, he recommends additional, detailed training. For this training, he suggests a blend of professional seminars, vendor training, professional and vendor literature, visits to distributed computing users, attendance at professional conferences and self-study materials.

Work Technology, User Needs

Although most experts agree that an information system should match users' needs, matching is usually approached in terms of organizational structure. Macintosh and Daft feel that this approach overlooks "the relationship between the technology of a work-unit and the amount and type of information it requires to perform effectively." By technology, the authors mean "the knowledge, procedures and techniques used to perform a given or-ganizational task." So they present a way to classify work-unit technology and pick a matching information support strategy.

They use two dimensions for workunit technology. Task knowledge means how well the work is under-stood — either well where there are objective procedures, instructions man-uals or standards; or not well where accumulated experience and judgment are relied upon. Task variety means the frequency of unexpected problems

– either high or low. This yields four categories:

· Programmable (well understood/low variety). Routine work such as assembly line and payroll.

· Professional (well understood/high variety). Technical work such as accounting, engineering and law.

· Craft (not well understood/low variety). Creative work such as glassblowing, winetasting and music

· Research (not well understood/high variety). Exploratory work such as high-energy physics and policy analysis

Three Dimensions

Macintosh and Daft use three dimensions to characterize information conveyed to work unit by a system. Amount means how much is needed to execute work unit tasks - either large or small. Focus means how imprecise the information is or how many interpretations it can have - either single or multiple. Massage means how much the work unit deliberates over the information or the pace of use - either quick or slow. In their paper, the authors overlap amount with massage

and distinguish four categories:

Concise (small amount and quick use, single focus).

· Elaborate (large amount and slow use, single focus).

Cursory (small amount and quick use, multiple focus).

• Diffuse (large amount and slow use, multiple focus).

Macintosh and Daft empirically verified that the amount of information used increases with both task variety and task knowledge, that information

Ci Data Rase Management-\$210

focus becomes sharper as task knowledge increases, and that information massage slows as task variety increases. Thus the proper match between the basic information system design and the work-unit technology is concise for programmable, elaborate for professional, cursory for craft and diffuse for research. Based on their re-search, Macintosh and Daft offer several design guidelines, which can be summarized as follows:

• Technology Over Style. Focus on

work-unit technology rather than individuals. Technology endures while managers come and go.

 Technology Over Change. Focus on matching the information system to work-unit technology before worrying about organizational change.

• Big Mistakes. It can be difficult to identify and understand precisely the user needs. However, even in difficult cases, the work-unit technology con-cept should be applied to avoid major

(Continued on In Depth/20)



IN DEPTH

(Continued from In Depth/19) errors of underbuilding or overbuild-

Next Week: Analysis and Synthesis.

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Dr. Robert W. Shirey is a group leader at The Mitre Corp. in McLean,

Since 1964 he has held positions at the University of Wisconsin's Social Systems Research Center and U.S. Army Mathematics Research Center, The Rand Corp., Computer Sciences Corp. and Boox, Allen & Hamilton.

In addition to his responsibilities at Mitre, Shirey teaches in the Management Science Department of George Washington University.
Shirey holds B.S., M.S. and Ph.D.

degrees from the University of Wisconsin and an M.B.A. from the University of Southern California.

By Jeffry Beeler

CW West Coast Bureau
BERKELEY, Calif. — A prototype of
Magnuson Computer Systems, Inc.'s two
most powerful IBM-compatible processors reportedly ran 35% faster than an
IBM 4341 Group I in a recent Magnusonsupervised benchmark test.

During the same evaluation, the prototype machine also reportedly provided as much as twice the throughput of Magnuson's own low-end M80/4 CPU, which belongs in roughly the same performance class as IBM's 370/148.

The benchmark test took place at Magnuson's San Jose, Calif., headquarters and involved an experimental version of the company's M80/42 and 43 mainframes, which are slated for first customer shipments late this year. Results from the test appear to confirm Magnuson's original performance claims for the two machines, both of which were announced in March 1979.

DLA Assignment

Magnuson conducted the benchmark test for the University of California's Division of Library Automation (DLA), an administrative body whose main mission is to automate the library services for the state's nine-campus university system. The DLA's chief assignment at present is to implement a "public union catalog information system" that is expected to integrate the university's vast and widely dispersed bibliographic holdings into a single, centralized data base accessible from any of the nine campuses' more than 100 libraries.

Tentatively scheduled to be implemented by 1982 or 1983, the proposed intercampus library system will represent a significant upgrade from the DLA's existing configuration, which is built around dual 8M-byte M80/4s supported by IBM's OS/360 operating system. The current configuration also embraces six 200M-byte Control Data Corp. 3330-type disk units and 14 of CDC's 625M-byte 3350-type disk units.

In an attempt to gauge how much processing power the university's future centralized library system will require, DLA

(Continued on Page 58)

Honeywell DPS-8 CPUs Gain Mid-Range Models

PHOENIX — Honeywell, Inc. has added to its large-scale DPS 8 processor line two midrange computer systems that can be used as modular additions by current system users or high-performance entry points by future users.

The DPS 8/62 is a single-processor machine which offers approximately 30% more power than the firm's DPS 8/52, introduced last October, the vendor said. However, the 8/52 can be field-upgraded to an 8/62 and the 8/62 can, in turn, be boosted to the company's top-of-the-line 8/70.

The 8/62 is a free-standing central system and consists of a CPU with from 1M byte to 8M bytes of main memory, a system control unit (SCU) and an I/O multiplexer (IOM) with 35 channel function slots expandable to 54 slots.

Field Upgrades

The DPS 8/44D is a dual-processor system that can reportedly be field-upgraded to a full tandem system. The double-CPU system offers 76% more power than a single DPS 8/44 which is part of the firm's established line. The two CPUs share the same

memory up to 4M bytes, as well as the SCU, and IOM.

By adding another SCU and IOM, the 8/44D becomes a full tandem system operating under a single copy of the separately priced Gcos III or Gcos 8 operating system. In the tandem configuration, components of each of the two complete central systems are present and interface with each other, reportedly boosting system power.

Both the DPS 8/62 and 44D make extended.

Both the DPS 8/62 and 44D make extensive use of microprocessors, large-scale integration circuitry and enhanced logic packaging techniques, a spokesman said.

The DPS 8/62 with 1M byte of memory costs \$759,135 or can be rented monthly on a five-year lease for \$20,816. The processor will be available for delivery in the third quarter of 1981.

The DPS 8/44D with 1M byte of main memory sells for \$424,00 and rents for \$10,520/mo. This machine will be available in the first quarter of next year.

in the first quarter of next year.
Additional SCUs and IOMs sell for \$27,050 and \$81,380, respectively, the spokesman said from the firm at P.O. Box 6000, Phoenix, Ariz. 85005.

Univac 1100 Uniprocessors Bow

BLUE BELL, Pa. — Univac recently expanded its 1100/60 mainframe line by adding uniprocessor versions of its multiprocessor E1 and E2 computers, introduced in March.

Like the 1100/62 E1 and E2, the 1100/61 E1 and E2 both have an 8k-byte cache memory. The processors also have 2M bytes of main storage, an I/O processor and a system support processor with maintenance controls, a spokesman said.

The uniprocessor E1 is said to provide a 45% performance improvement over the firm's entry-level C1 machine, while the E2 with its extended instruction set boasts a 40% greater performance than the C2. The C1 and C2 processors were launched in June of last year to kick off the 1100/60 series line.

Although the recent uniprocessor additions are reportedly capable of reaching new performance heights, the machines also carry prices 50% to more than 60% higher than the entry-level computers. The E1 is priced at \$11,343/mo, including maintenance, or can be bought for \$518,975. The

E2, in a similar hardware configuration, leases for \$12,139/mo and sells for \$555.545

Both the 1100/61 E1 and E2 are scheduled for delivery in the first quarter of 1981. The processor additions bring to 10 the number of computers in the 1100/60 series.

Further information on the processor series can be obtained from Univac at P.O. Box 500, Blue Bell, Pa. 19424.

Remote Service

ORLANDO, Fla. — Univac has announced a remote system maintenance service for users of its 1100 series mainframes.

The Remote Support Center, located in Roseville, Minn., is staffed 24 hours a day, seven days a week. Software specialists are on line Monday through Friday from 7 a.m. to 9 p.m. Central Standard Time.

Currently, the service is available only to 1100/60 users, but it will eventually be available for all 1100 systems, the vendor said

SYSTEMS&PERIPHERAL.

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NBS Seeking Comments On Magnetic Tape Standard

WASHINGTON, D.C. — Comments on a proposed federal standard for a magnetic tape cassette used in information interchange are being solicited by the Commerce Department's National Bureau of Standards (NBS).

Proposed for issuance as a Federal Information Processing Standard (Fips PUB), the standard covers "Magnetic Tape Cassette for Information Exchange, Dual-Track Complementary Return-to-Bias (CRB) Four States Recording on 3.81 mm (0.150 in.) Tape." It is based on a proposed voluntary industry standard that has been developed and passed by Technical

Committee X3B5 of the American National Standards Institute.

Before submission of the proposal for review and approval by the Secretary of Commerce, the views of manufacturers, federal agencies, the public and state and local governments will be considered.

A copy of the draft standard's technical specifications can be obtained from the Standards Administration Office, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234. To be considered, comments on the proposed standard must be received by the above office on or before Nov. 25.

Magnuson Prototype Shown 35% Faster Than IBM 4341

(Continued from Page 57)
officials recently commissioned
Magnuson to benchmark its prototype
M80/42 and 43 processors in a test
that consisted of multiple runs of three
jobs. Two of the jobs were computebound and one was I/O-bound.

One of the compute-bound jobs came directly from the division's production stream and involved reformatting and reducing bibliographic data that is stored archivally on tape and then loaded into a data base, according to the DLA's computing resources manager, Clifford Lynch. The task entailed the compiling and execution of a PL/1 program.

The other compute-bound job in-

volved a Snobol IV program designed to count character strings. At the DLA, such a program would typically use variable-length character encoding to compress the division's huge bibliographic data base and thus conserve disk space and minimize mass-storage costs, Lynch explained.

The I/O-bound job, meanwhile, basically involved transferring data from tape to disk at a rate that closely matched the benchmarked processor's channel speed, he explained.

In the compile-and-execute and the I/O-bound jobs, the benchmark test measured the amount of time the prototype Magnuson machine took to complete the assigned tasks. In the job involving character-string counts, by contrast, the test measured the number of records the CPU counted in exactly one hour.

Magnuson's test supervisors then noted the results from the three jobs and compared the figures with performance specifications they had derived earlier from a similar benchmark of IBM's 4341.

The comparisons revealed that the prototype Magnuson processor delivered 35% more throughput than the 4341 Group I and 5% less performance than the 4341 Group II, a Magnuson spokesman said.

Details Unavailable

In a subsequent Computerworld inquiry, Magnuson was asked to supply performance figures that showed specifically how the elapsed times for the prototype mainframe and the 4341 compared for each of the three test jobs. The company was unable, however, to make the requested details immediately available.

Comparison of the benchmark test results also revealed that, in the two compute-bound jobs, the prototype Magnuson machine boasted significantly greater power than the DLA's existing M80/4. In the I/O-bound job, however, the two processors proved roughly equal in performance, Lynch

Here are the specifics of how the two Magnuson machines compared in each of the three test categories:

 In the compile-and-execute job, the experimental processor's elapsed time totaled 24 minutes, compared to 42 minutes for the DLA's M80/4.

 In the I/O-bound job that involved restoring a disk volume from tape, both CPUs took roughly eight to nine minutes to perform the same assigned task.

In the compute-bound job emphasizing character-string counts, the prototype mainframe counted 13,300 records during an hour, whereas the M80/4 counted 7,100.

The results of the recent benchmark test proved of considerable interest to the DLA's computing officials, who have reportedly ordered two M80/43s to supplement or perhaps even replace their dual M80/4s. The Model 43s are expected to play a key role in the functioning of the DLA's proposed universitywide cataloging system.

When the system becomes fully operational two or three years from now, users will be able to consult the bibliographic holdings at any of the nine campuses from a single location.

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For Stand-Alone or Network Use

Datasystem 300s Get Entry-Level Model

MAYNARD, Mass. - Digital Equipment Corp. recently intro-duced an entry-level member to its Datasystem 300 small business computer line that can be used as a stand-alone system, network node or store-and-forward terminal.

The Datasystem 315 is based on the firm's PDP-11/23 microprocessor and is available with a choice of six programming languages and two operating sys-

The unit has 64K bytes of memory, expandable to 256K bytes, and employs a VT100 CRT terminal and dual RX02 double-density floppy disk drives for 1M byte of mass storage, a spokesman said.

Two Operating Systems

The Datasystem 315 is supplied with either the firm's commer-cially oriented CTS-300 operating system or with the RT-11 general-purpose operating sys-

tem.
CTS-300 includes the businessoriented Dibol-11 programming language, Decform program package for CRT screen operations and sort and file-handling utilities, the spokesman contin-

RT-11 offers a choice of five programming languages, including Fortran IV, Basic, Focal and APL, and can be used for realtime applications.

Geared for future expansion.

the system can accept additional floppy disk drives and terminals, well as communicate with other computer systems.

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The system can utilize Decnet. DEC's networking software, and can also communicate with IBM mainframes by using RDCP 2780/3780 or 3721 Dicam emulation packages.

Finally, both the CTS-300 and RT-11 operating systems are said to enable users to develop software that can migrate to larger systems as needs dictate, the spokesman pointed out.

The 315 can be fitted with an optional wheeled stand that allows users to stack system components or move the entire system from one area to another.

Prices for the Datasystem 315, including an LA120 180 char./sec printer and CTS-300 operating system, start at \$17,600. Initial deliveries are scheduled for next month, the spokesman said from the firm at 146 Main St., Maynard, Mass. 01754.

Memorex Adds Two Flexible Disks

SANTA CLARA, Calif. -Memorex Corp. has announced two additions to its flexible disk product line: a double-density 5.25-in. mini disk and a singledensity 5.25-in. mini disk with hub rings.

While the double-density version is available in both single-

single-density, single-sided version with hub rings was developed as an answer to drive-related hubbing problems on some 5.25-in. drives, according

and double-sided format, the

to a company spokesman. Such problems include im-proper centering and hub hole damage, he explained. Each product is available in either soft sector (unformatted) or in 10 or 16 hard sector versions.

The single-sided double-density version costs \$4.75/disk, while the double-sided doubledensity version costs \$5.50. The single-sided single-density version costs \$4.70.

Memorex is located at San Tomas at Central Expressway, Santa Clara, Calif. 95052.

Show Theme: Minis, Micros

NEW YORK - The fourth annual National Small Computer Show, opening here Oct. 30 and running through Nov. 1, will feature minicomputers and microcomputers of interest to business people and hobbyists alike.

According to show manager Ralph Ianuzzi, this year's show looks like it will be 20% larger than last year's.

Registration fees are \$10/day for show and lecture admission. The five-hour tutorial is \$220, which includes three-day show registration and all course materials. The tutorial will be offered Oct. 29-Nov. 1.

Further details and a complete tutorial outline are available from the show office at 110 Charlotte Place, Englewood Cliffs, N.J. 07632

Microtek Printer Priced Under \$1,000

SAN DIEGO - Microtek, Inc. has entered the less-than-\$1,000 printer market with its MT-80 series, 125 char./sec, 80- and 132-column bidirectional printer.

The MT-80 series printer supports the 96-char, upper- and lowercase Ascii set in three software-selectable fonts - of 5, 10 and 16.5 char./in. - on original plus three copies.

The microprocessor-controlled printer contains a 240-char. buffer, with additional data buffers to 3K optionally available in 1K increments.

In addition, a self-diagnostic program is automatically run on power up.

Life expectancy of the print head is 100 million characters mean-time-between-

The MT-80 series printer comes in two versions: the MT-80P Centronics-compatible parallel interface version for \$795 and the MT-80S serial RS-232 version priced at \$895. Microtek is at 9514 Chesapeake Drive, San Diego, Calif. 92123.







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R.W. Bare, Assistant Corporate Controller, J I Case, A Tenneco Company, Racine, Wisconsin

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"Through a visual display at the parts counter, a store clerk can gain

full information on the availability of a part in that store," says R.W. Bare, assistant corporate controller. "If the part is ordered, the Series/1 prints a picking ticket and produces an invoice to accompany the order.

"By speeding order handling and accounting procedures, the system has cut related workloads in half in some stores, helping to support a 10% to 20% growth in parts sales in the stores in which it is used. This productivity benefit alone justifies

the system for us. Most important, by transmitting consolidated data daily to Case headquarters, it gives management greater control over financial and production planning."

The IBM Series/1 is small enough to fit almost anywhere, flexible enough to manage a variety of data processing tasks and powerful enough to handle both remote terminal and central information processing. It features online capability so that information is available to



"Our IBM Series/1 network helps meet growing customer needs for parts and service while increasing productivity up to 30%."

you at any terminal just as quickly as it's processed. And because it's modular, Series/1 is ready to grow when you are. What's more, Series/1 is supported by an extensive service organization that enables IBM to respond promptly to your service needs, even in remote areas.

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three ECC options. One of which includes single-bit error correction that is independent of and transparent to the processor.

Using industry-standard Mostek dynamic RAMs, memory configurations for the MK8018 range from 32K ×16/21 up to 128K×16/21. For the MK8024, choose from 16K×16/21/22 up to 128K×16/21/22.

Call your Mostek regional sales office for more details. Northeast: 617/256-1500 East and South: 201/842-5100 North Central: 612/935-4020 South Central: 214/386-9141 Western: 714/549-0397 Northwestern: 408/237-5081

Or contact Mostek Corporation, 1215 West Crosby Road, Carrollton, Texas 75006, (214) 323-1802. In Europe, contact Mostek Brussels 660.69.24.

> LEDs and feature select switch

Series/1-Based POS System Runs NCR Retail Terminals

BOULDER, Colo. — An IBM Series/1-based point-of-sale (POS) information system that handles inventory
control, sales analysis, sales productivity, commissions, credit billing, sales
tax, profit and loss is available from
Systems Design & Development Corp.

Systems Design & Development Corp.
The 5DD 2151 system uses the firm's proprietary software to operate NCR Corp. 2151 cash registers on-line, according to the firm. Data entered into the 2151 Retail Terminal is sent through in-house communications lines to an NCR 751 Digital Con-

Megasoft Offers Retail Turnkey

SAN MATEO, Calif. — Megasoft Computer Systems, Inc.has introduced a turnkey computer system for average and small independent retail stores.

The Retail Sales and Profit Builder can be used for processing handwritten invoices after the sale or for writing sales invoices at the counter, the vendor said.

The system also automatically collects clients' names and prepares mailing lists, prints retail sales invoices, performs cash register functions, maintains daily accounts receivable and produces daily reports on items sold, the vendor said.

The system is available on a lease/-purchase option for \$420 a month. Megasoft may be reached through P.O. Box 6121, San Mateo, Calif. 94403.

Lamda Has Desktop For Feed Store Use

WATERVILLE, Kan. — A desktop microcomputer with software developed for grain and fertilizer businesses is available from Lamda Systems, Inc. The product is called Lamda.

The unit displays operating instructions on its CRT monitor and responds instantly with "advice" when incorrect entries are made, the vendor claimed. It can be used in a normal office environment to manage and print accounting records.

Lamda can maintain accounts payable and receivable, general ledger, cash receipts, payroll and inventory data. Individual access codes ensure confidentiality and power failure will not affect stored information.

Users can get up-to-date replay of financial reports for the month, year, or any month of the previous year.

The price for the system ranges between \$8,500 and \$20,000 depending on configuration. The vendor may be reached through P.O. Box 113, Waterville, Kan. 66548.

Apple Gets Bar Reader

SARATOGA, Calif. — Advanced Business Technology, Inc. is offering Barwand, a modified Hewlett-Packard Co. Heds 3000 reader for Apple Computer, Inc. microcomputers.

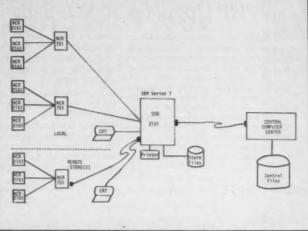
The unit enters data from bar-coded documents and costs \$195.

Advanced Business Technology is at 12333 Saratoga-Sunnyvale Road, Saratoga, Calif. 95070.

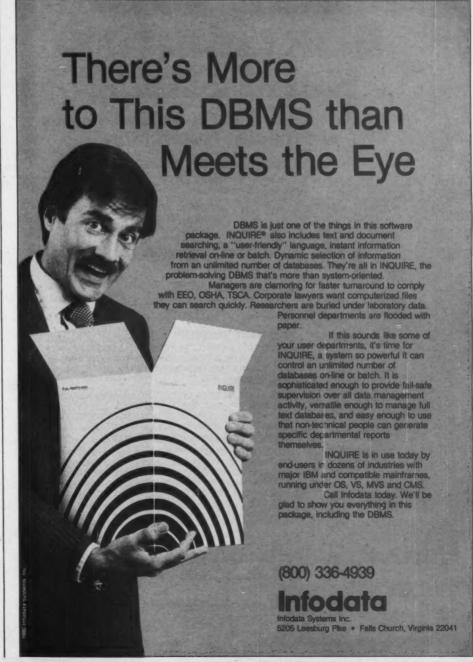
centrator that sends the data to the

Cobol application programs in the SDD 2151 can process the data according to the type of data in the message. Besides NCR 2151 or 2152 cash registers, 3270-like devices may be attached to the system, which also communicates with an IBM host CPU — System/3, System/34, 370, 4300 or 30 series.

Hardware for the system costs \$25,000; software costs \$15,000; and an additional \$2,500 buys a Cobol compiler to allow third-party programmers to write additional reports. The firm is located at 2355 Canyon Blvd., Boulder, Colo. 80302.



SDD 2151 feeds financial activity of NCR cash registers to IBM CPU.



HP Upgrades 1000 L-Series

PALO ALTO, Calif. — Hewlett-Packard Co. Series now has a complete Image data base reportedly transformed its HP 1000 L- management facility, the vendor noted. has reportedly transformed its HP 1000 L-Series computer into a 512K-byte two-board microcomputer by combining 64K-byte random access memory chips with newly enhanced memory management capabilities.

The new member of the L-Series offers the DMA per-channel I/O capabilities, software features and memory capacity associated with larger computers and is well suited for communications, the vendor claimed.

Other applications include industrial automation, instrumentation and process control.

Compatible with all other HP 1000s, the L-

The HP 1000 L-Series microcomputers are available as boards, rack-mountable processors or in systems.

A 2103LK board-level processor costs \$13,250; the HP 2103L rack-mountable computer costs \$15,450

The HP 1000 Model 10 system with CRT terminal, 1.2M-byte flexible disk drive, cabinet and 12M-byte HP Winchester technology disk costs \$33,500, the vendor said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

Two Plessey Systems Based On PDP-11/23s, PCS-001

MARLBORO, Mass. - Digital Concepts, Inc. has unveiled two Plessey Peripheral Systems, Inc. computers based on Digital Equipment Corp. PDP-11/23 CPUs and featur-PCS-001 time-sharing software.

Syst 13VC is a 10M-byte system with one removable and one fixed disk expandable to 20M bytes. The cost is \$19,900. Syst 13VF is a 27M- byte system with one remov-able and one fixed disk expandable to 100M bytes. The cost is \$23,900.

The software package is designed to produce a multiterminal operating environment expressly suited to business DP needs on a small machine, according to the vendor.

The system is offered as an alternative to the DEC CTS-300 commercial operating system. It features several enhancements, including time-sharing of the operating system rather than only Dibol application programs and fully automatic line printing spooling, the vendor claimed.

Digital Concepts, Inc. is located at 45 Maple St., Marlboro, Mass. 01752.

Controller Links Winchester Drive To GPIB Systems

SUNNYVALE, Calif. controller that reportedly links Shugart Technology, ST-506 micro-Win-Inc.'s chester disk drive to host computers using the general-pur-pose interface bus (GPIB) standard has been introduced by Microcomputer Systems

The MSC-9305 is said to provide an on-board interface to ST-506 disk drives and to incorporate the GPIB interface standard (IEEE-488 and HP-IB) for hookup with comput-ers using the GPIB standard bus.

First application of the MSC-9305 will be in systems incorporating the ST-506 5.5-in. disk drives and the Hewlett-Packard Co. HP-85 desktop computer.

Besides interfacing other GPIB computers such as the Commodore Pet, Inc., Xerox Corp. 1350 and HP ma-chines, the unit can be used with computers that can accommodate GPIB adapters, according to the vendor.

Such computers include those from Digital Equipment Corp., Apple Computer, Inc., Prolog Corp. and those using Intel Corp.'s Multibus bus. Price of the MSC-9305 is

\$700. The company is located at 432 Lakeside Drive, Sunnyvale, Calif. 94086.

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	- RJM 02	DM 11/80
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OMPUTER INDUSTR

CSC Indicted for GSA Contract Fraud

By Jake Kirchner

CW Washington Bureau ALEXANDRIA, Va. - Computer Sciences Corp. (CSC) and five former or present employees have been indicted here for racketeering, bribery and fraud in connection with a large federal teleprocessing contract.

In a 57-count indictment handed down by a federal grand jury here Oct. 8, CSC, its five

employees and an independent consultant were charged with bribing a federal contracting officer to help CSC win its 1972 Infonet teleprocessing services con-

The contract, which expired in 1977, reportedly earned CSC's Infonet operation over \$100 million. During the life of the con-tract, the company provided the majority of federal time-sharing

Reacting to the indictment, a spokesman at company headquarters in El Segundo, Casaid there has been some confusion between the government and CSC over "several highly technical and complex provisions" of the contract, but said the charges are "unwarranted

Besides the firm itself, also

named as defendants were John W. Luke, a CSC vice-president, member of the board of directors and former president of the Infonet Division; Erwin L. Allen, former Infonet vice-president: Peter C. Loux, a former CSC branch manager; and company employees Thomas A. Marti and Norman W. Derrick.

Also indicted was Herbert G. Blecker, president of Icarus Corp., a Maryland subcontractor to CSC on the Infonet contract.

DEC, Tektronix Deny GSA Charges

CW Washington Bureau WASHINGTON, D.C. - Digital Equipment Corp. and Tektronix, Inc. have reacted with a loud cry of "foul" to recent al-legations the two companies bilked taxpayers for millions of dollars by overcharging the federal government for DP equipment

The firms termed "premature," 'inappropriate" and "absurd" charges by a Senate subcommittee and the General Services Administration (GSA) that the companies illegally failed to offer federal agencies their lowest customer discount rates

GSA auditors told the Senate Federal Spending Parctices Subcommittee Oct. 2 they had found the two vendors hid the fact they charged significantly lower prices to some commercial customers than those offered the federal government.

Initial Stage

A GSA official told Computerworld the agency is looking into the possibility of bringing criminal charges against the two companies, although the investigation is now only in its "initial stage.

To qualify for a multiple award schedule contract with GSA, the federal purchasing agency, companies by law must agree to offer government agencies their best prices. Routine GSA audits, however, allegedly found the DEC federal discount of 14% was as much as 6% lower than discounts to some private-sector buvers.

Tektronix was said to also have offered greater discounts to commercial customers, some of whom bought less equipment than did federal agencies. In its most damaging charge, GSA also claimed both companies attempted to hide the discount disparities.

These deliberate and concealed practices led to federal overbillings of \$1.3 million by Tektronix and \$1.2 million by DEC in 1978, GSA said. Subcommittee Chairman Sen. Lawton Chiles (D-Fla.) said the audit information indicated the possibility of fraud by the two corporations.

Chiles' reaction was mild, however, in comparison to the responses of the two companies. Both claimed they have not wrongly overbilled the gov-ernment and objected to Chiles' statement that they refused to

(Continued on Page 73)

Second Indictment

For Loux and Blecker this was their second indictment for activities relating to the contract. Last January Loux was found innocent in federal court here of charges he received kickbacks from Blecker for steering Infonet consulting work to Icarus. Blecker, who was convicted of those charges, is appealing (Continued on Page 70)

CDC Settles DP Course Dispute

ST. PAUL, Minn. - Control Data Corp. and the Federal Trade Commission (FTC) have resolved the acrimonious seven-year dispute over advertising practices of CDC's DP instruction business.

In a proposed consent agree-ment filed earlier this month in U.S. District Court here, the company agreed to not misrepresent the potential benefits to students of courses offered through its Control Data Institute opera-

In return, CDC dropped its suit charging the FTC violated its rules and procedures during the protracted case.

CDC throughout has denied using deceptive advertising practices. The company's agreement to the terms of the consent order do not constitute an admission it violated the law.

The FTC complaint, made in

1973, alleged that between 1969 and 1971 the firm's instruction centers exaggerated the value of its vocational instruction and overstated its success in placing graduates in industry positions.
In Washington, D.C., the FTC

said the company agreed it will

· Misrepresent the qualifications for obtaining a job in the computer field, such as by stat-(Continued on Page 74)

Industry Complacency Slammed

By Jake Kirchner

CW Washington Bureau WASHINGTON, D.C. — While the federal government has been slow to help U.S. businesses fighting for world market shares, American technology companies should also be faulted for complacency and rigidity in international business, according to NCR Corp.'s chairman, William S. Anderson.

Although much can be done to spur the growing relationship of business and govern-ment to maintain the preeminence of U.S. industry, American companies cannot rely solely on federal assistance to overcome Japanese and Western European challenges, Anderson told a recent meeting here of the Computer and Business Equipment Manufacturers Association.

"We've been quick to unmask the folly of much of the legislation, regulatory excesses and bureaucratic red tape imposed on the economy in recent years," he told the Oct. 9 gathering of industry executives. "But we've often been slow in preparing our own companies for the winds of change that began sweeping through most industries in the 1970s."

'Spirit of Enterprise

The success of the U.S. information industry came from managers "driven by a spirit of enterprise, a willingness to take risks and a determination to make their products the best they (Continued on Page 74)



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Data Services Subsidiary Questioned

Citicorp's Response to Fed Seen a Concession

ARLINGTON, Va. — Citicorp's response to the Federal Reserve Board's request for further information about Citishare, its proposed subsidiary to offer DP services appears to be a concession that Citishare's anticipated DP offerings may go beyond the scope of existing banking laws, according to the Association of Data Processing Service Organizations, Inc. (Adapso.).

The Fed asked Citicorp early this summer to explain its proposed Citishare operation in further detail after the bank applied to expand its proposed services to include electronics funds transfer, Adapso said.

In explaining its Citishare proposal in a letter, Citicorp said that while Regu-

lation Y of the banking laws would encompass the activities of Citishare, "the language of that section may not be sufficiently flexible to accommodate the diverse ways in which such DP services [are] offered today and may be offered in the future.

"Nor does the current language an-

"Nor does the current language anticipate the technological development and changes in the marketplace that have occurred in the 10 years since the board conducted the rulemaking proceeding on DP activities or those that lie ahead."

The letter, written by Patrick J. Mulhern, Citicorp's senior vicepresident and general counsel, asked the Fed to clarify Regulation Y, Adapso noted

This regulation governs nonbanking subsidiaries of bank holding companies.

Fierce Opposition

Adapso has been a fierce opponent of the bank's Citishare application, arguing that it allows the bank entry into the DP services industry, which is prohibited by federal banking laws.

Last June the Fed granted Adapso's request for a formal trial-type hearing on the Citishare application [CW, June 21]

Adapso has argued that Citicorp's services are outside the realm of normal banking activities. For example,

Citicorp offers a municipal parking violations service in New York City and a financial data base service that can be used for investment analysis rather than banking, an Adapso spokesman maintained.

STC and Documation Modify Agreement On Proposed Merger

LOUISVILLE, Colo. — Storage Technology Corp. (STC) and Documation, Inc. have modified the letter of intent related to the merger of Documation into STC.

The updated arrangement stipulates that .72 share of STC will be distributed to Documation shareholders at the time of the merger, with the remaining .13 share of STC held in escrow to cover contingent and undisclosed liabilities of Documation.

The original agreement in early September called for a payout of .85 share of STC common stock for each share of Documation common stock.

The two firms expect a definitive merger agreement will be reached shortly.

Fujitsu Extends Hold On U.S. Market With Winchester Line

SANTA CLARA, Calif. — Fujuitsu has made another move into the U.S. marketplace with the introduction by Fujitsu America, Inc. (FAI) of a family of 8-in. Winchester disk drives it claimed offers the highest capacities to date for the OEM market.

The Model 2311 at 48M bytes and the Model 2312 at 84M bytes achieve high performance because of a permanent magnet rotary actuator using closed-loop servo systems.

Complete head positioning specifications are 5 msec track-to-track, 20 msec average and 40 msec maximum, FAI said.

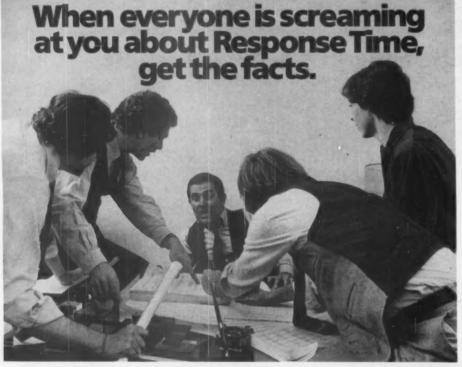
Evaluation Units

Evaluation units will be available in December and large production quantities in April, according to a spokesman.

The 2311 will cost \$3,195 at OEM quantity 100 and the 2312 will cost \$3,795 on a stairstep OEM price schedule, he added.

FAI also released a family of low-cost 8-in. Winchesters, the 11.7M-byte Model 2301 for \$1,660 and the 23.4Mbyte Model 2302 for \$2,095 in OEM quantities of 100.

FAI is based at 2945 Oakmead Village Court, Santa Clara, Calif. 95051.



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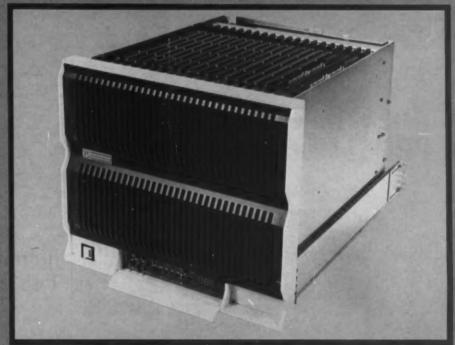
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Quarter Earnings Rise 32% at IBM, 15% at NCR

IBM's third-quarter earnings rose 32% and NCR Corp.'s earnings rallied, increasing 15% after a decline last quarter.

For its latest quarter, IBM's earnings were \$884 million or \$1.51/share, up from 1979's third-quarter earnings 6669 million or \$1.14/share. Pretax earnings for the period rose 10.4%.

Revenues for the period rose 20%, advancing to \$6.5 billion, up from \$5.4 billion in the corresponding period a

For the year to date, IBM's earnings totaled \$2.3 billion or \$3.99/share, up 16.3% from just over \$2 billion or \$3.43/share earning in the same period in 1969.

Revenues reached \$18.4 billion, up 14.8% from revenues of just over \$16 million reported for the first nine months of last year.

Commenting on the earnings, IBM Chairman Frank T. Cary noted purchases of equipment were considerably higher than in the comparable periods last year. However, because of the heavy volume of purchases in the fourth quarter last year, it is unlikely earnings growth rate in the first nine months will be sustained for 1980, he added. Outright sales represented \$2.5 billion of IBM's third-quarter revenue—a 25% increase over sales in the third quarter of 1979.

"The growth in net earnings for the nine months and for the third quarter, compared with the corresponding periods of 1979, was enhanced by a reduction in the effective rate for U.S. federal and non-U.S. income taxes. This reduction was primarily in the non-U.S. operations and results, in part, from adjustments of certain prior periods' tax liabilities," Cary commented.

NCR Figures

At NCR, third quarter revenues totaled \$792.3 million, up 12% from revenues of \$706.7 million in the third quarter of 1979. For the year to date, revenues passed \$2.2 million, an 11% increase over last year.

Third quarter earnings at the firm rose to \$54.4 million or \$2.03/share compared with last year's net of \$47.2 million or \$1.74/share. For the year to date, earnings totaled \$136.7 million or \$5.11/share up slightly from the

\$136.2 million or \$5.08/share for the

first nine months last year.

NCR's Chairman William S. Anderson said incoming business for the quarter showed a slight gain over 1979's third quarter, and that increased order volume from overseas continued to offset declining U.S. order rates.

Comdex Slated For Nov. 19-21

LAS VEGAS — Dr. Federico Faggin, president of Zilog, Inc., and Sandy Sansing, president of Digital Systems of Florida, Inc., will keynote the second annual Comdex conference and exhibition here for dealers, distributors and reps on Nov. 19-21.

Dr. Faggin headed up the design team at Intel Corp. in the early 1970s that produced the world's first microprocessor. He founded Zilog in 1974, where he still presides over the production of large-scale integration and very large-scale integration circuitry, as well as micro-based systems.

Sandy Sansing, former salesman with the Burroughs Corp., organized Digital Systems of Florida in 1975.

Conference admission is \$10 to floor exhibits only and \$125 to the four-day conference. Additional information is available from the organizers at the Interface Group, 160 Speen St., Framingham, Mass. 01701.

Informatics Buys 'Taps' Software

LOS ANGELES — Informatics, Inc. has completed the purchase of the Transacion Application Processing System (Taps) from Decision Strategy Corp. for an undisclosed amount.

The product, which forms the basis of a new Informatics Division, is expected to generate approximately \$2.5 million a year in revenues for Informatics and give the company a software entry into the interactive terminal applications segment of the minicomputer market, according to Informatics' president, Dr. Walter F. Bauer.

Michael J. Parella, former chairman of the board of Decision Strategy, was named vice-president and general manager of the Informatics' Taps Division, to be based in New York.

Taps, which consists of a communications manager, applications manager and a relational data base manager, runs on minicomputers made by Prime Computer, Inc., Hewlett-Packard Co. and Digital Equipment Corp. as well as IBM mainframes, Bauer said.

Game?

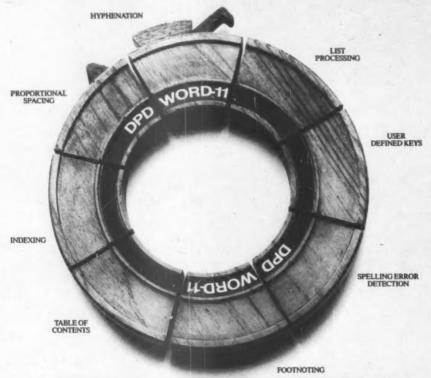
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CSC Charged With 57-Count Graft Indictment

(Continued from Page 65) that decision [CW, Jan. 14].

The Oct. 8 indictment said CSC and John Luke conspired to bribe General Services Administration (GSA) contracting officer James C. Lindsey to help the firm win the teleprocessing services contract.

Lindsey was allegedly paid \$34,000 and given a job with CSC through a separate corporation set up to hide the fact CSC was the real employer. In

return, Lindsey, who was not indicted, gave CSC inside information about the contract to help the firm win it, according to the indictment.

Other charges include allegations CSC charged federal agencies a higher rate for time-sharing services than commercial customers, while hiding the rate differences.

CSC also fraudulently al-

form benchmarking tests on the Infonet system at lower usage rates than the company had already quoted GSA, the grand jury said.

In addition, the indictment said the firm increased the charge to one federal agency for use of CSC's Cost software by 50%, an increase the grand jury said was fraudulent because CSC knew the supposed new version of Cost was neither new nor improved.

The 57 counts cover charges against the defendants of conspiracy, racketeering, mail fraud and making false claims against the government.

Maximum Penalties

Maximum penalties for the charges are 20 years in prison and \$25,000 in fines for conspiracy and racketeering, five years and \$1,000 for mail fraud and five years and \$10,000 for false claims.

The defendants were scheduled for arraignment in federal court here Oct. 17. Trial date was to be set at that time.

Years of Negotiations

GSA and CSC have been negotiating for several years over alleged overcharges to the government by the firm for services rendered under the contract.

Several GSA audits of the contract were turned over to a special GSA-Justice Department task force that has been investigating cases of fraud against GSA, the federal pur-

chasing agency. CSC's response to this second indictment involving either the company or its employees in connection with the Infonet contract was that the firm "intends to defend itself vigorously against charges.

Charges 'Unwarranted'

In the statement released from CSC headquarters, the firm said "based on the company's knowledge of the facts, the charges are unwar-ranted and CSC believes that the company and the employ-ees charged will be vindicated.

"There are differing views as to the meaning of several highly technical and complex provisions of this contract. But CSC believes there is no basis for criminal charges.

The company cooperated fully with the grand jury in its two-year investigation," the statement added, and "CSC believes it acted properly in its dealings with GSA."



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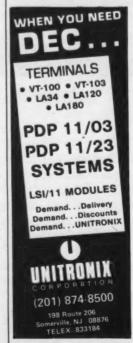
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With 227 Vendors

Office Automation Exhibits Dominate Info 80

By Marcia Blumenthal

CW Staff NEW YORK — It looks as though the Information Management Exposition & Conference Info 80 held here recently is becoming an office automation exhibition.

While a few vendors that seemed out of place at Info said they are reconsidering continued participation in the show, others said the show was the only one in New York this year and was a good opportunity to meet with clients.

In all, Info drew 227 exhibitors, up from 172 last year. Some 22,115 peo ple browsed through the exhibits at the Coliseum this year. Last year, the Coliseum had 16,900 visitors.

The vendors displaying office automation as well as business systems reported satisfactory traffic through

> **Nickels** & Dimes

The Board of Directors of Cullinane Corp. has declared a two-for-one stock split, payable on Nov. 10 to share-holders of record as of Oct. 20.

National Semiconductor Corp. has filed with the Securities and Exchange Commission a registration statement for a public offering of 1.5 million shares of common stock.

Harris Corp. and Quotron Systems, Inc. have filed a registration statement covering the secondary offering and sale of 528,122 shares of Quotron common stock owned by Harris.

Wavetek has declared a three-for-two split of the company's common stock. Certificates respresenting the additional shares will be mailed on or about Oct. 20 to stockholders on record as of Sept. 27.

Datapoint Corp. has filed a registration statement with the Securities and Exchange Commission relating to a proposed public offering of 1.5 million shares of common stock.

American Research and Development, a division of Textron, Inc., has joined with a private group to invest over \$1 million in the Image Resorce Corp. of Westlake Village, Calif.

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their booths. IBM gathered a lot of attention with it Displaywriter and Hewlett-Packard Co. and Exxon Information Systems received a steady flow of onlookers.

Notable Absentee

Most notably missing was Wang Laboratories, Inc., which reportedly with-drew from the show at the last minute. On the other hand, Computer Auto-

mation, Inc., showing its Syfa prod-ucts, said there was a strong possibility that the Commercial Systems Division would not exhibit at Info.

Qume said the National Computer Conference and Syntopicon were better shows for the company. Info is turning into a local show, with most people traveling no more than 300 miles, one marketing executive noted. The company prefers to exhibit at a conference that draws a more geographically diverse base, he added

Agreeing with Qume was BTI Com puter Systems, Inc., a vendor of 32-bit minis and other mini products. If the company exhibits at Info next year, the booth will be handled from the company's New York office rather than marketing personnel from all over the country, a spokesman noted.

Another 32-bit mini maker Formation, Inc. said it couldn't judge the results of the show because Info was the first show in which the firm had exhi-

Qantel Corp. and Nixdorf Computer Corp., both displaying a wide range of products, said most visitors were primarily interested in low-end word processing-type products. But both firms said they would most likely continue to participate in Info.

Another vendor seemingly out of place at the exhibit was McCormack Dodge Corp., a supplier of general ledger software packages for large IBM and Burroughs Corp. systems. However, a spokesman said the firm wanted to get its name circulated and let people know it was expanding its software development into the mini

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Ouring 1978, a set of four business systems was developed for sale in the CP/M* environme under the name "Peachtree Software." However, during this period there was a split among the principals which resulted in a parting of the ways — TCS Corporation and Retail Sciences (RSI).

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Amdahl's Firm Named Acsys

SAN JOSE, Calif. — Acsys Ltd. is the name of the computer company started last month by Gene M. Amdahl, the founder of Amdahl Corp. Acsys was incorporated in Bermuda.

Although the firm's first product will not be ready until 1985. Amdahl said it will be targeted at both the generalpurpose and scientific computer markets and compete with IBM's expected H series.

Executive Corner

 Jack D. Kuehler, president of IBM's System Products Division, has been elected a vicepresident of IBM.

 James J. Byrne has been promoted to vice-president of the North America Marketing Group at Mohawk Data Sciences Corp. Brian Gaylord has been moved up to vice president of marketing support for that group, and John H.

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Crawford has been made vicepresident of U.S. sales.

- Donald E. Lewis has been promoted to vice-president of manufacturing at Lear Siegler, Inc.'s Data Products Division.
- Bruce Crockett has been elected treasurer and vicepresident of finance of Comsat General Corp., where he will be responsible for all finance and procurement functions of that organization.
- Merrill Newman has been named vice-president of finance at Convergent Technologies, Inc.
- Dr. Donald R. Haring has been appointed vice-president of research and development for General Automation, Inc.
- Elliot Wassarman has been elected vice-president of marketing at North Star Computers, Inc.
- Richard Guthman Jr. has been named vice-president of Computer Management, Inc.
- Hal Georgens is chairman of the board and chief executive officer as well as president of Data Electronics, Inc. The board increased five to seven members with the recent addition of Tommy Davis and Tom Stephenson.
- James Jamfrey has been appointed vice-president of European marketing at Dataproducts Corp. His territory will include Europe, the Middle East and Africa.
- Mark Brown has been named vice-president of corporate development and marketing for the DMW Group, Inc. Product planning, acquisitions and new business opportunities for the firm will be Brown's responsibilities.
- Jason Stewart has been elected president of NEC Electron, Inc., a subsidiary of the Nippon Electric Co. of Tokyo.
- Arthur L. Schimel has been appointed vice-president of sales at Digital Associates Corp.
- C. Art Lasch Jr. has joined Machine Intelligence Corp. as president, and Peter Szasz has joined that company as director of marketing.
- Richard A. Cortese has been named vice-president of operations at General Automation. Inc.
- Richard Charlton has been appointed vice-president of advanced planning and technology at Century Data Systems, a Xerox Corp. subsidiary.

Acquisitions

STSC, Inc. has acquired 87.5% of Societe de Traitments et de Services Conversationnels, a French corporation.

National CSS, Inc. has announced its acquisition of Program Products, Inc., which will now operate as part of National CSS' software products group.

International Microfilmers, Inc. has reached an agreement in principal with NLT Computer Services Corp. for the purchase of assets and operations of International by NLT for an undisclosed figure.

NLT Computer (NLTCS) recently acquired Itel-PAS of Miami, a part of Itel Corp. NLTSC renamed it Medical Services Division, which will provide billing, in-

surance, claim processing and medical management report services.

Shareholders of Phoenix Corp. and Baldwin-United Corp. completed an agreement in principle by which Baldwin-United would acquire 100% of the outstanding shares of Phoenix Corp. for a package of notes and cash aggregating \$6.25 million.

Datum, Inc. announced the acquisition of the AACOM Products operations from Systron-Donner Corp. for an undisclosed cash amount. The acquisition includes the transfer of the associated key management, engineering and production personnel who will occupy a new facility in Concord, Calif.

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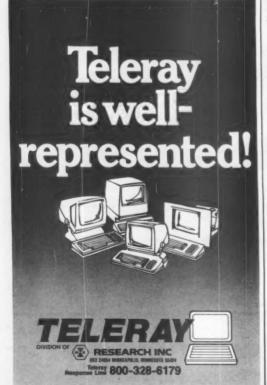
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Contracts

Datacrown, Inc. has been awarded a six-year, \$8.8 million contract to provide information processing services to the U.S. Department of Housing and Urban Development.

Century Data Systems, Inc. will deliver 500 of its Intelligent Marksman disk drives to the Konan Corp. under the terms of a recent contract.

Tracor, Inc. has received a \$4.2 milproceed with the development, preproduction and testing of Tracor's microminiature central processor, for use in defense equipment, especially designed for the Navstar Global Positioning System.

Computer Software Analysts, Inc. has been retained by the U.S. National Guard with a \$24 million contract, to install Burroughs Corp. B1955 information processing systems. These systems will be placed in National Guard headquarters in each of the 50 states, Puerto Rico, the Virgin Islands and the District of Columbia

E-Systems' ECI Division has received a \$2.4 million contract from Lockheed-California Co. for deliveries of highspeed thermal printers and electronic keyboard sets. They will be used with the avionics system on Lockheed P-3C Orion antisubmarine warfare aircraft by the U.S. Navy and allied nations.

fused to give the company the audit findings so it would know what the al-

The audit report, only preliminary at

this point, has not been made available

to the company, even though a request

for the information has been made un-

der the Freedom of Information Act,

according to Stone, Tek's corporate

communications manager at company headquarters in Beaverton, Ore.

Because the audit is still incomplete,

Chiles' "insinuations of fraud and misconduct are absurd. They're just ri-

diculous," Stone said. The firm has

absolutely abided" by the terms of its

GSA contract to offer its best discount

"He's certainly made some pretty da-maging innuendos," Stone said of Chiles, and said making un-substantiated allegations in a public

rate to federal agencies, she said.

legations were.

Worldtech, a technology marketing service of Control Data Corp., will open computer-related companies in Lulea, Sweden, as a result of a recently signed agreement with the Swedish Ministry of Industry. One company will provide microprocessor education and service, and the other will develop courseware for Control Data's Plato education system.

Harris Computer Systems announced a joint marketing agreement with Comprehensive Computing Systems and Services. Inc., to make the Tegass logic simulation and test generation software available to users of Harris computer systems.

An agreement has been signed be-tween Applicon, Inc. and Structural Dynamics Research Corp. (Sorc) that provides for the incorporation of Sorc computer-aided engineering software into Applicon computer-aided design and manufacturing systems, as well as the development of future joint pro-

Dash Industries, Inc. plans to enter the retail computer market through its subsidiary, Cascade Data, Inc. which will provide end-user support, education and maintenance for the various retailers in their respective territories.

DEC, Tektronix Cry 'Foul' (Continued from Page 65) "We don't fully understand why the appear before the subcommittee to ancommittee chose to go ahead when it swer the allegations. did," he continued, saying that DEC The subcommittee did not give enough notice to put together a rebut-tal, according to Tektronix spokeswo-man Susan Stone; the panel also rehad asked the Chiles panel to wait un-

over the contract dispute were con-

Continued Talks

til the firm's negotiations with GSA

Unlike Tektronix, DEC has received a copy of the audit report and the company is continuing talks with GSA over several of its aspects, according to Berube. "I understand they [GSA] are seeking a refund," the DEC spokes-

Berube declined to discuss the allega-tions in detail, saying DEC does not want "to wage a war of words with a Senate committee through the pages of the media.

'We obviously have disagreements arising out of the audit report, but we were angered by the fact that it was raised in public hearings, due to the fact that we were involved in negotia-tions with GSA," he said.

In Washington, D.C., last week, the GSA said the audit activity will continue. At the same time, the agency is beginning an investigation "to discern whether or not we have a matter here that is capable of referral to the Department of Justice," according to Mi-chael Eberhardt, GSA deputy inspec-

money involved in the two contracts, "we're putting high priorities on both," Eberhardt said. However, the agency has not ruled out trying to resolve the disputes through negotiations, perhaps leading to refunds by the two companies to the federal government, he said.

Supershorts

Timberline Systems, Inc. has signed an OEM agreement with Hewlett-Packard Co. to develop software for three models of HP graphic plotters: The 7225A, 7220S and 7220A.

Univac announced an agreement with Walt Disney Productions to sponsor a major computer technology exhibit at the new \$800 million "Ex perimental Prototype Community of Tomorrow" center project now under-way at Disney World in Orlando, Fla. The center is due to open in October

J. Phillip Carlson has been appointed director of government liaison for the American National Standards Institute (Ansi). Developing, strengthening and maintaining Ansi's relations with the executive and legislative branches of the federal government will be Carlson's primary responsibilities.

Cullinane Corp., a producer and marketer of computer software, has adopted the name, Cullinane Database Systems, Inc. The company also announced plans for a product line of applications software.

The board of directors of the Computer & Communications Industry Association has elected Ryal R. Poppa chairman of the association's board. Poppa is the president and chief executive officer of Pertec Computer Corp.

Information Science, Inc. has sold its subsidiary corporation, Program Products, Inc., to National CSS, Inc., a subsidiary of Dun & Bradstreet, Inc., for an undisclosed amount.

Prime Computer, Inc. recently opened its newest wholly owned subsidiary, Prime Italy, in Milan, Italy.

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hearing is not "an appropriate way to handle a topic as serious as this." **DEC Dismayed**

Similarly, DEC said it was dismayed by the allegations and that "the committee chose to make them in the form of a public hearing," according to Richard Berube, DEC director of corporate public relations in Maynard, Mass

The company has not violated the law in its sales through its multiple award contract, he said. "We are confi-dent we have dealt with GSA fairly at this point," Berube said.

tor general. Because of the large amount of

R&D Meet Set For December

RESTON, Va. - "How to Successfully Keep Your Research and Development on Track" is the title of the American University's Center for Technology and Administration conference, to be held here Dec. 10-12.

More than 80 senior persons from research and development organizations will lead the conference's 40 workshops. They include Dr. Alan Altenau, director of research at Firestone Tire and Rubber Co.; Louis Carrese, director of planning and analysis at the National Cancer Institute; and R.H. Caulk, coordinator of petroleum refining research and development at Exxon Research and Engineering Co. The American Chemical Society and the Institute of Electrical and Electronics Engineers are participating.

Conference admission is \$250. Further details can be obtained from the Center for Technology and Administration at the American University, Washington, D.C. 20016.

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NCR Exec Attacks Complacency

(Continued from Page 65) could manufacture," he said. Today's management, however, may have forgotten some of those basic principles.

'Not Flawless'

"Certainly the record is not flawless," Anderson said, assessing the competitiveness, or lack of it, of U.S. industry today.

"In contrast with some of our international competitors, we have frequently subordinated long-range planning to short-range expediency. We have too often been more interested in where our companies will be next year, than in where they could be five or 10 years from now

'We have also devoted too much time and too many resources to shoring up eroding markets and too little time and too few resources to penetrating emerging new markets.

We have poured billions of dollars into the development of new products but have broken little new ground to

improve distribution methods, marketing skills and administrative effi-

"Under the pressures - whether real or imagined - from shareholders and the investment community in general, we have subscribed to the belief that unless a company reports improved profits with clockwork regularity, quarter after quarter, it is not a wellmanaged company.

Tarnished Label

We have allowed the 'Made in USA' label to become tarnished in many markets by inadequate quality control and overly zealous attempts to slash costs.

"We've preached about the need to keep the spirit of enterprise alive, but too often when it came time to actually put our chips on the board, we've been excessively cautious.

in sum, Anderson concluded, "the United States has created most of its current economic problems and it is only the United States which can solve these problems." Clamoring to Washington for help is not the way to go about it, he added.

The business-government relationship has been one of "suspicion and distrust," he claimed. On one hand, the government has "consistently overlooked the fact that this country's leadership in information processing is one of its greatest national assets."

Half-Hearted Tries

Business, on the other hand, has made "only half-hearted attempts to understand the pressures under which government officials function and to try to achieve workable compromises within those constraints.

There is a lot to be done by both sides, according to the NCR chairman, "but it's going to take more than a change of attitude if this country is to regain the international competitiveness it enjoyed in the 1950s and 1960s.

The problems of promoting U.S. products and services abroad is not as worrisome as the basic problem of "the lack of a practical and consistent industrial strategy designed to unshackle this country's potential competitive strengths."

International Thinking

U.S. businesses must begin to think internationally and Congress must establish "appropriate export incentives" and remove current disincentives, he said.

As a necessary beginning, current tax laws should be amended to encourage greater research and development expenditures and to permit more rapid depreciation of investments in plant and equipment.

"To my knowledge, no one in the American computer and business equipment industry is asking for taxpayer subsidies," Anderson said. "Nor do we expect government to protect us from the high risks inherent in a fastmoving, highly competitive industry.

But we are a capital-intensive industry, and we're becoming more so every year. Quite literally, the future growth of this industry depends on the availability of billions of dollars of private capital over the next several years and," he said.

That capital will not be available in the amounts required unless current tax laws are substantially modified," Anderson added.

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CDC, FTC Settle Dispute On DP Course Advertising

(Continued from Page 65) ing a college education or other posthigh school training is not an advan-

• Misrepresent the significance of the company's aptitude tests by claiming they determine whether a person qualify for computer-related work:

· Falsely state that to obtain work, graduates can rely entirely on the job placement services offered by the company or misrepresent that the services

In addition, the company agreed to provide prorated refunds to students who drop out of the firm's courses. An outside arbitration service will be available to students with complaints about the courses or tuition. The arbitrator will have the power to order partial or full refunds to the students, according to the FTC.

Finally, CDC agreed its course salesmen will clearly identify themselves as 'sales representatives" so prospective students will know they are not vocational counselors.

CDC View

The company issued a statement from its headquarters in Minneapolis saying "We're greatly pleased at the resolution of this long-standing complaint. It concludes eight years of

"It is for the most part," CDC added, 'a recognition of practices we instituted nearly a decade ago, which now are industry standards.

Begun in 1972

CDC spokesman William Shaffer said the terms of the agreement correspond to practices the company started in 1972, when its training operations were réstructured.

The firm's 22 U.S. training facilities place from 90% to 100% of their graduates, numbering some 5,000 a year, he

Placement records are open to prospective students and those who do not finish the programming, operations or maintenance courses offered are given a prorated refund of their tuition, according to Shaffer.

The agreement with the FTC came after three offers by the company since 1973 to reach a settlement in the case. In May 1978 CDC filed suit in U.S. District Court charging the FTC allegations were obsolete, damaging to the company and that the government had unnecessarily delayed settling the case.

According to the FTC, the proposed consent agreement will be subject to public comment for 60 days. After Dec. 8 the commission will decide whether to make it final.

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- EBCDIC and ASCII
 - cl) is a Greek myth
 - c2) are two wild and crazy guys
 - c3) are twin cities
 - c4) beat two pair
- c5) are two robot movie stars
- How do you spell Edsger Dijkstra's name?
- What is an OAG?
- Recursive code is
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 - a) Recursive code is
- · Sketch the layout of O'Hare.
- Bohm and Jacopini
 - a) are an Italian bobsled team
 - b) make designer jeans
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 - d) shot J.R.

- Which Sharpie color runs out first?
- DFD is a commonly used abbreviation for
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- b) Detroit Fire Department
- c) Dual Floppy Disk
- d) Canonical Synthesis
- What is the area code for Avogadro's number?
- Pick which one doesn't belong:

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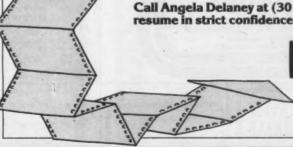
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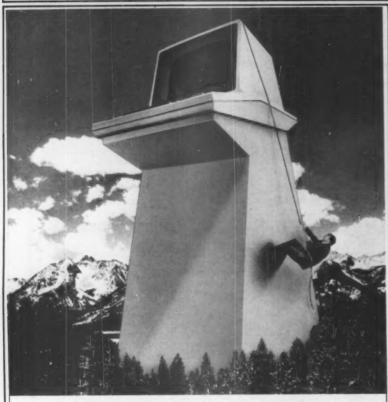
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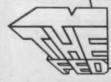


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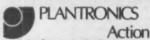
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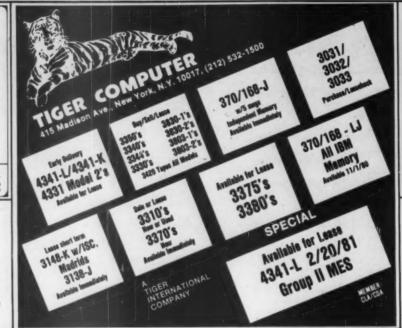
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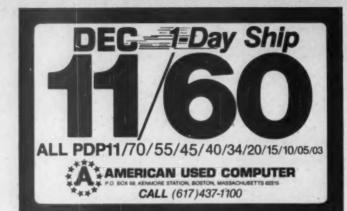
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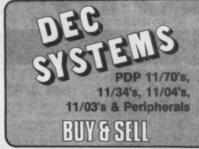
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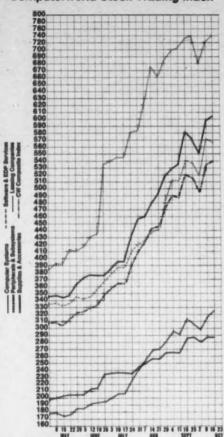
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Computerworld Stock Trading Index



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Computerworld Stock Trading Summary

TRADE QUOTES, INC.

							CLUSING PRICES W	CAESCAY.	OCTGBER 1	3+ 1980					Cembridg	e, Mass. (02139
8			occessp# [1 6						6			PR1		
CH		1979-80 RANGE (1)	CLGSE 0CT 15 1980	MEEK BET CHRGE	PCT CHNGE	CH		1979-80 RANGE (1)	CLCSE OCT 19 1980	MEEK RET CHAGE	PCT CHNGE	X C		1979-80 RANGE (1)	CLOSE OCT 15 1980	MEEK MET CHASE	PCT CHNGE
	COM	PUTER SYS	TEPS				505 Twa	At & EDP :	SAULTES								
A	AMDAHL CURP	19- 42	33 3/8	+2 1/2	+8.0												
0	SURRCUGHS CORP COMPLTER AUTOMATION	9- 27	22 1/4	-3 1/2	-5.5	0	ANACOMP INC	7- 20	3 1/4	+1 1/4	*6.9	1 4	DATA ACCESS SYSTEMS DATA PRODUCTS CORP	11- 35	16 3/6	+1 1/6	47.3
N N	CUNTROL DATA CORP	39- 77	75 3/4	-1 5/8	-2.1	0	ANALYSTS INTL CURP	3- 9	9	4 3/4	+9.0	o	DATUP INC	2- 5	3	+1 1/4	+33.3
0	CRAY RESEARCH INC	30- 99	94 1/2	+1	+1.0	A	APPLIED DATA MES.	31- 52	22 3/4	-1 1/4	-9.2	0	DECISION DATA COMPUT DELTA DATA SYSTEMS	2- 6	2 1/2	- 3/8	-6.9
1 3	DATA GENERAL CURP DATAPOINT CORP	46- 87	95 3/4	+4 1/2	+5.9	1 0	COMPLTER HURIZUNS	1- 9	0 3/4	+1	+17.3	1 6	DUCUPATION INC	7- 27	16 1/2	-1 7/8	-10.2
	DIGITAL EQUIPMENT	52- 96	95 1/4	- 1/4	-0.2	0	COMPUTER NETWORK	4= 9	6 3/4	- 1/8	-1.8	0	DATARAM CORP	4- 37 3- 8	7 5/8	+ 3/8	+3.6
1 6	ELECTRUMIC ASSDC.	9- 21	21	- 1/2	+8.3	0	COMPUTER SCIENCES COMPUTER TASK GROUP	11- 30	50 2/8	+ 1/2	-25.3	0	ELECTHONIC # 6 #	21- 72	89	-2	-2.8
R	FOUR-PHASE SYSTEMS	20- 49	- 31	-1 1/2	-4.6	0	COMPUTER USAGE	2- 10	8 3/4	C	0.0	0	FARRI-TER	1= 4	3 1/0	- 3/8	-10.7
N O	FOXBURD GENERAL AUTOPATION	31- 55 7- 19	9 5/8	+2 1/2	+16.6	0	COMPUT AUTO REP SVC	11- 21	9 1/8	- 1/8	-1.3	0	GENERAL CUMPUTER SYS	12- 30	5 3/4	+ 1/2	-2.2
10	GRI CUMPUTER CORP	1- 3	1 1/8	0	0.0	ő	CULLINANE CORP	18- 69	64 3/4	+1 3/4	42.7	0	GENERAL TERMINAL CP	1- 4	1 1/2	- 1/4	-13.7
N	HEWLETT-PACKARD CO	46- 82	01 1/2	+ 3/8	+0.4	0	DATA DIMENSIONS INC	1- 6	1 7/6	+ 1/8	47.1	N N	HAZELTINE CURP	23- 51	51	+3 1/2	-1.5 +7.3
I N	HONEYWELL INC	50- 79	93 3/4	+ 3/8	+0.5	0	DATATAB USI CORP	4- 9		- 1/4	-3.0	0	INCOMMATION INTL INC	8- 15	14	0	0.0
0	MAGNUSON COMP SYSTS	20- 37	34	+ 3/4	+2.1	N	ELECTRONIC DATA SYST	19- 37	33	- 5/8	-1.0	0	INTEL COMP	13- 33	32 7/8	-47 1/2	-49.0
0	MANAGEMENT ASSIST MANUFACTURING DATA S	9- 25	84 7/8	+3 3/4	47.5	0	INFURNATICS INC	9- 25	2 1/8	+ 1/4	+1.1	0	LUNDY ELECTRONICS	4- 17	16 3/4	+5 3/4	+52.2
				2.7		0	IPS COMPUTER MARKET.	20 4	3	0	0.0						
0	MINI-COMPUTER SYST	9- 31	3 3/8	+ 1/2	91.7.	0	KEANE ASSOCIATES	3= 9	5 1/2	c	0.0	0	MSI DATA COMP	5- 16 10- 34	14 1/2	- 3/6	+1.7
1 6	NCR	52- 82	74	-1 3/4	-2.3	0		2. 5	1 3/4	- 1/2	-22.2	A	MUHANK GATA SCT	10- 31	30 1/2	- 1/2	-1.6
N	PRIME COMPUTER INC	15- 49	46 7/8	+ 1/2	.41.0	1 4	LOGICUN MATHEMATICA INC	12- 27	26 1/4	+ 5/8	0.0	0	PAKACYNE CORP	2- 10	12	- 1/2	-0.9
1 %	SPENK IN-ELMER SPENKY RAND	26- 68 42- 60	48 3/8 52 3/8	+3 5/8	-1.1	0	MATHEMATICAL APP GAP	7- 33	29 1/2	-3	-9.2	1 2	PENRIL CURP	4- 15	12 5/8	+ 1/2	+4.1
A	SYSTEMS ENG. LABS	11- 45	43 3/4	0	0.0	0	NATIONAL DATA CURP	10- 29	27 172	- 3/4	-2.6	0	RAMIER CORP	10- 18	20 1/2	+3 3/4	+17.1
0	TANDER CUMPUTERS INC	13- 68	138 3/8	-3 5/8	-2.5	0	PROGRAMMING & SYS	5- 12	12 3/8	+ 7/8	0.0	0	SCAN DATA	1- 5	3 374	- 1/8	-7.3
	WANG LABS.	17- 60		- 1/8	-0.2	0	RAPIDATA INC	4= 9		+ 1/6	+1.5	N	STURAGE TECHNOLOGY	12- 24	23 7/6	+ 1/2	+2.1
						0	STSC INC	21- 34	24 1/2	-1 1/4	*1.0	0		14- 47	42 1/2	-2 3/4	+11.5
1						ő	SCIENTIFIC COMPUTERS	6- 27	25 1/4	- 1/2	-1.9	A	TEC INC	3- 9	6 1/4	+ 1/4	44.1
1		ING COMP				N	TYMSHARE INC	34- 78 5- 15	14 3/4	+ 3/8	+2.6	N.	TEKTROGIA INC	42- 70	6 1/8	+ 1/4	+0.3
	resi	TAR COMP.	WHIES.			1 2	WES SYSTEMS	4= 20	18 1/2	-1	-5.1	0	TESOATA SYSTEMS CP	8- 26	36	+1 7/8	+13.2
0		13- 27	26 1/2	+4 1/2					*****			8	TIMEPLEX INC	7- 29	2 1/2	- 3/4	-2.8
N A	COMPERCE GROUP CORP	6- 18	1 1/0	+ 1/8	40.6	1	nfelland	HALS & SU	(62471662			1 "					0.0
A	CUMPUTER INVSTRS GAP	2- 4	1 7/8	- 1/4	-11.7	N.		13= 24	15 1/8	- 1/2	-3.1	1	SUPPL	IES & ACCE	SSCPIES		
0	CONTINENTAL INFO SYS	2- 15	4 1/0	+ 1/2	+10.0	1 %	AMPEX CURP ANDERSON JACOBSON	9- 18	33 5/8	+4 3/8	+14.9		AMERICAN BUS PRUDS	8- 15	13 3/4	- 5/8	-4.3
A	LCL INC	3- 6	3 1/0	0	0.0	N	APPLIED DIG DATA SYS	5- 12	11 7/8	- 1/8	-1.0	0		1= 2	3/4	0	0.0
N.	DPF INC	3- 12	8 3/4	- 0 1/8	0.0	0		3- 19	17 3/4	+1 7/8	+11.8	NO	BARRY WEIGHT CYBERMATICS INC	8- 22	20 3/4	-1	0.0
0	LEASPAC CORP	1- 2	5/8	0	0.0	A	BULT PERANER & NEW	12- 35	35	+3 3/4	+12.0	A	DUPLER PRODUCTS INC	11- 10	14 1/6	- 5/8	-4.2
A	PIONEER TEX CORP RELIANCE GROUP INC	24- 79	3 5/8	+ 5/0	9.0	N.	BURKER-RAMO	17- 41	36	+1 5/8	-6.0	1 2	ENNIS BUS. FGRMS	13- 21	18 1/8	0	0.0
h	U.S. LEASING	12- 23		+1	04.7	0	CAMBRIDGE MEMORIES CENTRONICS DATA COMP	20- 55	29 1/2	-2 7/8	-8.8	0	MOURE COMP LTD	27- 37	34 1/0	- 1/8	-0.3
							CETEC CURP	3- 7	7 1/4	+ 1/8	+1.7	N O	NASHLA CURP STANCAND REGISTER	20- 35	37 1/2	+ 1/4	+3.7
						0	CUMPLIER DEVICES INC	9- 10	6 7/8	• 1/4	+14.5	A	TAB PHODUCTS CU	13- 34	- 33 3/4	- 1/2	-1.4
						0	COMPLIER CUMPUN.	4- 10		+1 5/8	+25.4	16		11- 18	16 5/6	+1 1/8	+7.2
				_		0	COMPLIER CONSULES COMPLIER THANSCELVER	1- 5	3 1/2	+ 3/4	+16.6	~	WALLACE BUS FURNS	23- 45	45 1/4	4 1/2	4111
0	CONT NONEW YORKS 40AME LONATIONALS MONIO OTOC PRICES ARE GIU PR 1) TO REAMEST CULLAR	MESTI O.O	VER-THE-CO	UNTER	tc	AN	CUMPLIERVISION CUMP	24- 92 13- 25	67	-1 5/8	-2.3	1					

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Economical purchase price is just the start of your savings with SSI's 300 line-per-minute band printer. Easy maintenance and reliability make SSI's B-300 the lowest cost-of-ownership printer in its speed. If you need 300 lpm output, can you afford not to own it?

Is it versatile?

SSI's B-300 is so versatile that it's revolutionary. Character font bands are changed as easily as a typewriter ribbon. Matching the band to the output needs saves you paper, time, money and operator headaches. Loading and adjusting paper and clean cassette ribbons are a snap. The B-300 is quiet and it produces five clear copies. Versatile? Unbelievable!

What kind of maintenance is needed?

Very little...and most of it is handled in-house due to the convenience of the diagnostic display. Field-proven dependable!

MORE QUESTIONS FOR THE ANSWERS:

Compatibility?

Southern Systems guarantees it! We design and manufacture our own interfaces so the B-300 and the M-200 as well as all other SSI printer systems will fit your computer...whether it's DEC, HP, DG, SEL, TI or practically any other.

Delivery?

In 30 days or less.



Can I afford it?

SSI's 200 lpm impact matrix printer system costs less than ever before, Just compared to the B-300, the M-200 is amazing...it gives you two thirds of the performance at one half the price of the B-300!

Is it versatile?

The M-200 from Southern Systems gives you 128 characters in condensed, expanded or standard print. Up to six clear copies and form-loading from the front, rear or bottom, SSI makes it possible for use with most mini and micro systems, serial or parallel, Definitely versatile.

What kind of maintenance is needed?

Simplicity of design makes the M-200 unbelievably maintenance-free. In fact, no scheduled preventive maintenance is required. The unique print head has a life of 500 million characters plus it's operator-changeable. A diagnostic display eliminates unnecessary service calls.



SOUTHERN SYSTEMS, INC.

2841 Cypress Creek Road Fort Lauderdale, FL 33309 (305) 979-1000; (800) 327-5602 Talex 522135

Thanks for all these answers. Now give me more. Send information on:	My computer is:		
——— M-200 ——— B-300 or B-600 (300 or 600 lpm band)	Title		
The 2550 (1500 lpm Charaband)The 2200 family (300, 600, 900 lpm drum)	Company		
CT-1200 family (600, 100, 1200 lpm ChainTrain)	Address		
	City	State	Zip
My needs are:Immediate;3-6 months;For information only	Telephone		

